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REGIONAL ANESTHESIA IN MAJOR SURGERY.*

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The most important step in the development of modern surgery, following the aseptic treatment of wounds, has been the possibility of operating without pain. The desire to relieve pain is as old as the history of man, but its consummation was long delayed. After the discovery of chloroform and ether a new era opened for the surgeon. The giving of these agents was entrusted to the young physicians without experience or special training, and all too often, to the lay relative or friend of the patient. It was soon discovered that the mortality from anesthesia was frightfully high, and that postoperative convalescence was remembered with horror. So efforts were made to improve the purity of anesthetic agents and various apparatus invented to improve the technic of administration. These improvements advanced so rapidly that we soon lowered our mortality and so greatly lessened postoperative complications that we felt all had been attained in improving upon anesthesia. So in this satisfaction the majority of surgeons ceased to give further thought to anesthesia, but thanks to the few who continued to push forward, we owe the possibility of this assembly here today, and you men owe to them all honor for creating one of the most important adjuncts to modern surgery—the *trained anesthetist.*

I desire to discuss a valuable adjunct to your specialty and feel that in the near future the well trained anesthetist will be equally as proficient in the use of local and regional anesthesia, as he is in general.

Local anesthesia in the past has been kept apart, and like general narcosis, has had its few men who have ever pushed forward. The advancement has been marvelous since the advent of cocain. Like chloroform and ether, our research men worked faithfully and long to rid it of its impurities and to abstract an alkaloid that was but slightly toxic, and as the fruits of their labors, we have today *novocain.* However, many and varied statements have been made by different surgeons as to its toxicity.

In searching the literature I am unable to find any satisfactory report upon its toxicity. Therefore, the purpose of the following investigation, made by Dr. W. C. Coulter, Pathologist at the Baptist Sanitarium, Houston, Texas, Newell Tilton, Ph.D., and myself, here reported, was to determine the toxicity of novocain when administered subcutaneously for local anesthesia. The property of comparing the results of different investigators, studying different local anesthetics, by different methods, is at times questionable. Some of the other criteria for comparing and studying local anesthetic agents, pharmacologically, are purely arbitrary and are, therefore, not directly indicative of subcutaneous toxicity ratios.

*Read during the Fourth Annual Meeting of the Southern Association of Anesthetists with the Southern Medical Association, Jefferson Hotel, Dallas, Texas, November 10-11, 1925.

EXPERIMENTAL PROCEDURE

The novocain used in this investigation was procured from the Metz Laboratories.

Rabbits.—The rabbits used in this investigation were bought on the open market from dealers in Houston, Texas. No attempt was made to segregate the animals according to weight, color or sex. All the animals used weighed over one pound, eight ounces—the average being about three pounds. Upon receipt in the laboratory all rabbits were weighed, tagged and placed in hutches. They were fed carrots and raw lettuce, and kept under close observation for twenty-four hours to make sure that they were in good condition.

Method of Administration.—The rabbits were weighed on the morning of an experiment and injections made into the abdominal muscles, beginning with minute doses, gradually increasing.

DATA OF ADMINISTRATION

Rabbit.	*Wt. in Gm.*	*Mg. of Novocain given*	*Amt. mg. per kilo body wt.*	*Symptoms*
1	2470-13.6	32.4	13.1±.06	None
2	1820-13.6	64.8	46.6±. 2	None
3	2100-13.6	97.2	.46.2± 3	None
4	965-13.6	130	135 ± 1	None
5	1360-13.6	194	143 ± 1	None
6	1480-13.6	259	176 ± 2	Mild, toxic (6)
7	1870-13.6	324	173 ± 1	Mild, toxic (7)
8	2040-13.6	389	190 ± 1	Mild, toxic (8)
9	2270-13.6	454	200 ± 1	Mild, toxic (9)
10	2270-13.6	518	228 ± 1	Mild, toxic (10)
11	1020-13.6	389	381 ± 4	Severe, toxic (11)
12	1130-13.6	518	456 ± 5	Severe, toxic (12)
13	681-13.6	518	760 ± 15	Died (13)
14	681-13.6	648	952 ± 19	Died (14)
15	1930-13.6	308	160 ± 1	Given in 32 ccs H_2O Slight drowiness (15)
16	1930-13.6	583	302 ± 2	Given in 60 ccs H_2O Mild, toxic (16)
17	1820-13.6	259	142 ± 1	None
18	908-13.6	162	178 ± 2	Mild, toxic (18)

DETAILED DATA OF TOXIC REACTIONS

Rabbit No. 6.—Weight: 1480 gm. was given 259 mg. of novocain at 8:28 A. M. *Symptoms*: At 8:35 rabbit very quiet, sitting on haunches: increased respiration. 8:38 Dropping of both ears. Ears completely paralyzed. Respiration increasing. 8:40 Tonic contraction of hind legs, body bent in half circle. 8:45 Showing some relaxation, apparently conscious. 9:00 Rabbit apparently normal, running around over floor, eating some carrots.

Rabbit No. 7.—Weight: 1870 gm. Was given 324 mg. of novocain at 8:33 A. M. *Symptoms*: 8:40 Very restless and respiration increased, apparently conscious, showing air hunger. Very rapid respira-

tion, sitting on haunches. Paralysis of both ears. Lying flat on belly, hind legs extended. 8:41 Going into convulsions. Hard convulsions with tonic contraction of hind legs. Body bent forward. Powerful contraction of neck muscles, drawing head almost between shoulders. Extreme tonic contraction of hind legs, apparently conscious. 8:44 Neck muscles showing some relaxation. 8:45 Relaxation of muscles taking place. Neck muscles relaxing, left hind leg in steady tremor. 8:51 Apparently returning to normal, trying to get up. Respiration still fast. 8:53 Muscles relaxed. Body straightened out. 8:54 Very quiet, apparently relaxed. Respiration becoming less rapid. 9:15 Quiet, making efforts to arise. 9:28 Lying on side, body bent backwards, making no effort to rise, but apparently conscious. 10:04 Still lying down, respiration somewhat slower, but still showing extreme prostration. 10:23 On feet, but with no coordination of hind quarters. 11:00 On feet, has regained coordination of limbs, occasionally kicking out of hind legs and twitching of ears. Respiration but slightly increased. 11:30 On feet, appears normal, except increased respiration. At 2:05 normal, walking around and eating.

Rabbit No. 8.—Weight: 2040 gm. Was given 389 mg. of novocain at 8:44 A. M. *Symptoms.* 8:51 Increased respiration, very quiet, sitting on haunches, increased respiration. Paralysis of both ears. 8:53 Stretched out, flat on belly. 8:55 On side. 8:58 Going into convulsions. Very rapid respiration, neck muscles violently contracted, drawing head between shoulders. 9:10 Still in convulsions, very rapid respiration, apparently conscious. 9:30 Making some effort to get up. Incoordination of muscles in hind legs. 10:00 Up on feet, rapid respiration. 10:30 Apparently normal.

Rabbit No. 9.—Weight: 2270 gm. Was given 454 mg. of novocain at 2:44 P. M. *Symptoms*: 2:56 Rabbit very quiet, sitting on haunches. 2:58 Paralysis of both ears. 3:00 Flat on belly. 3:02 Turned on side. 3:05 Going into convulsions, respiration very rapid. 3:10 Violent contraction of neck muscles, drawing head backward and between shoulders. Still having convulsions. 3:20 Very quiet, rapid respiration. 3:30 Some relaxation of neck muscles and occasional twitching or throwing out of hind legs. 3:40 Making some effort to get up, muscles relaxed, incoordination. 4:00 Up on feet, evidence of some prostration. 4:30 Normal.

Rabbit No. 10.—Weight: 2270 gm. Was given 518 mg. of novocain at 2:49 P. M. *Symptoms*: At 2:52 Sitting on haunches, very quiet. 2:53 Paralysis of both ears. 2:56 Prone on belly, very rapid respiration, slight contraction of neck muscles. 3:32 Convulsions developed, which were mild. 3:40 Rabbit very quiet, increased respiration, still prone on floor. Convulsive movements of hind legs. 4:00 Making some effort to arise. Loss of coordination. 4:30 Up on feet, apparently normal. 4:40 Normal.

Rabbit No. 11.—Weight: 1020 gm. Was given 389 mg. of novocain at 3:25 P. M. *Symptoms*: 3:28 Incoordination. 3:29 Dropping of ears, increased respiration. 3:30 Violent retraction of head and neck, prone on right side, very quiet, very rapid respiration. 3:40 Complete prostration. 4:00 In deep coma, respiration light, very rapid. 4:30 Still in deep coma, respiration light, very rapid. 5:00 Returning to consciousness, incoordination of limbs. 5:30 Conscious, but no control of limbs, respiration much improved. 6:00 Has regained control of front legs, hind legs still paralyzed, making efforts to arise. 6:30 On feet, but incoordination of hind quarters still present. 7:00 Same as 6:30, only control of hind quarters slightly improved. 7:30 Same as 7:00 P. M., coordination slightly improved. 8:00 Same as 7:30, no improvement apparent. 8:30 No improvement. At 7:00 A. M., 9-26-25, rabbit on feet, moving about slowly. Still some incoordination of hind quarters. Muscles of legs and back seem to be stiffened, slightly contracted, making movements slowly with apparent difficulty. By 10:00 A. M., rabbit normal.

Rabbit No. 12.—Weight: 1130 gm. Was given 518 mg. of novocain at 3:43 P. M. *Symptoms*: 3:50 No symptoms apparent. 4:00 Paralysis of the ears, lying down on belly, respiration very rapid. Turned on side, complete prostration. Respiration light and very rapid. 4:30 In coma, respiration light and very rapid. 5:30 Aroused from coma and made an effort to arise. 5:45 Trying to get on feet. 6:00 On feet, staggering around, no control of front or back legs. 6:15 Walking about slowly, gait unsteady. 6:30 Walking slowly, gait improved. 7:45 Still some incoordination. 8:00 Still trying to get about. 8:30 Slight improvement, better control of limbs. 9-26-25 at 7:00 A. M., on feet, very slight incoordination of hind quarters, muscles of back and legs seem stiffened. Appears fully conscious. 7:30 Some improvement. 9:00 Normal.

Rabbit No. 13.—Weight: 681 gm. Was given 518 mg. of novocain at 7:50 A. M. *Symptoms*: 7:53 Paralysis of both ears and hind legs. 7:54 Prone on belly. 7:55 On side. 7:56 Motionless, on floor, head and neck retracted, respiration very rapid. 8:00 Passed into deep coma, with occasional twitching of legs and head. 8:05 Same as 8:00. 8:09 Dead, respiratory failure. No convulsions.

Rabbit No. 14.—Weight: 681 gm. Was given 648 mg. of novocain at 7:54 A. M. *Symptoms*: 7:56½ Appears sick, sitting on haunches, hind legs drawn under body. 7:57 Stretched out on belly, violent contraction of muscles, throwing himself backwards and turning a complete somersault. Neck muscles violently contracted, respiration extremely

rapid. 8:00 Mild, tonic, respiration very rapid. 8:02 Passed into deep coma with occasional twitching of legs and head. 8:03 Respiratory failure, no convulsions.

Rabbit No. 15.—Weight: 1930 gm. Was given 308 mg. of novocain at 10:52 A. M. *Symptoms*: 11:40 Seems drowsy, but no other symptoms have developed. 11:45 No symptoms. 11:50 No symptoms. 12:10 No symptoms. 12:20 No symptoms, respiration normal. 12:30 Hopping about, seems normal except that the hind legs may be slightly stiffened. 12:45 Same as 12:30. 1:00 Same as 12:30, not very active. 1:15 No change. 1:30 Normal.

Rabbit No. 16.—Weight: 1930 gm. Was given 583 mg. of novocain at 11:03 A. M. *Symptoms*: 11:09 Paralysis of right ear, respiration slightly increased. 11:40 Having slight convulsions. 11:45 Down on right side, limbs stiff, occasional kicking of hind legs, respiration increased. 11:50 Respiration very rapid, down on side, muscles contracted. 12:10 Same as 11:50. 12:20 Legs twitching, moving head from side to side, still prone on right side. 12:30 Lying on side, legs still stiff and occasional kicking out. Moving of head stopped, respiration not as rapid. 12:45 Lying on belly, trying to get on feet, incoordination of limbs, respiration nearer normal. 1:00 P. M., Up on feet, trying to walk, incoordination of limbs. 1:15 Hopping about, gait unsteady. 1:30 Up, sitting on haunches, seems to be rapidly returning to normal, has an occasional twitching or nervous jerk of head. 2:00 Normal.

Rabbit No. 18.—Weight 908 gm. Was given 162 mg. of novocain at 2:39 P. M. *Symptoms*: 2:42 Dropping ears. 2:45 Some stiffness in hind legs, on belly, respiration very rapid, slight twitching of body. 2:46 Convulsions, falling on side, very rapid respiration. 2:53 Muscles of neck contracted, drawing head back between shoulders, prone on side, respiration very rapid. 3:00 Still prone on floor, legs and body twitching. 3.20 Trying to get on feet, some incoordination. 3:40 On feet, getting around slowly, still some incoordination. 4:00 Rapidly returning to normal. 5:00 Normal.

Discussion and Further Data

I would like to call special attention to the uniformity of all symptoms and also to the small margin between the non-toxic and toxic dose of novocain, which, in this series of experiments, proved to be 2/17 of a grain.

It appeared that these rabbits could take one grain of novocain per pound without manifesting any symptoms.

It is also important to note the large amount of novocain required to produce death, it requiring 5-1/3 grains per pound to kill the rabbit.

We also learn that as the toxic doses increased, the convulsions became lighter and fewer. It was noted that neither of the rabbits receiving the lethal dose had convulsions but appeared profoundly prostrated and rapidly went into deep coma.

A series of rabbits were used to determine the effect of the addition of adrenalin, if any, upon the toxicity. It was found that the addition of three minims of adrenalin to the ounce of solution increased its toxicity 3/17 of a grain per pound, body weight. In other words, the solution containing adrenalin produced toxic symptoms when given in amounts of 16/17 of a grain per pound, body weight.

I also ran a series of rabbits to determine the effect, if any, of morphin and hyoscin. It was found that it did not in any way affect the toxicity of novocain.

It was also determined that slight ether narcosis was a specific in relieving the toxic symptoms. As soon as the rabbit inhaled a few whiffs of ether he became quiet, respiration much slower, and when held in this state for thirty to forty minutes, he would, when awakened from the ether anesthesia, get up in a normal condition.

Computing Novocain Toxicity for Man

The tables of computing the toxicity of drugs states that we multiply the amount of novocain given the animal per kilo of body weight, by seventy, which gives the amount that is considered safe for a man weighing 160 pounds.

Maurice J. Lewi, Medical Consultant, H. A. Metz Laboratories, Incorporated, reports the detailed results of a test with novocain, C92, are as follows:

Killed none out of 5 rats at 600 mgm. per kilo body wgt.
Killed none out of 5 rats at 800 mgm. per kilo body wgt.
Killed none out of 5 rats at 1000 mgm. per kilo body wgt.
Killed one out of 5 rats at 1200 mgm. per kilo body wgt.
Killed four out of 5 rats at 1600 mgm. per kilo body wgt.

The minimal lethal dose for Novocain, C92, by the above described method, is 1200 mgm. per kilo body weight for the albino rat. This represents a dose of 90 grams (3 ounces) Novocain powder for a man weighing 75 kilos (165 pounds) when injected subcutaneously as a 2 per cent solution.

A quantitative comparison of the toxicity of the alkamine esters of aromatic acids used as local anesthetics contains the details of the intravenous method which we developed and adopted for the determination of the toxicity of novocain. The minimal lethal dose of novocain by this method is 50 milligrams per kilo body weight which represents a dose of 3.75 grams (58 grains) novocain powder for a man weighing 75 kilos (165 pounds) when injected intravenously as a 2 per cent. solution.

For infiltration anesthesia in man novocain may be freely injected if slowly done, in properly prepared solutions of 0.5 per cent to 1.0 per cent strength in almost unlimited quantities, provided care is taken

not to inject the solution intravenously. Babcock has repeatedly used 500 cc of a 1 per cent novocain solution in a single operation. Farr (*Practical Local Anesthesia and Its Surgical Technic*, pp. 38-39) has employed 45 grains (3 gm.) in 0.5 per cent solutions without untoward symptoms ,and Meeker (*Jour. Pharmacology and Exper. Therap.*, Vol. 22, pp. 375-392) employed 500 cc. in 0.5 solution without toxic manifestations.

Charles W. Hooper and Elsa Becker, New York, report that Butyn is the most toxic of the alkamine esters of the aromatic acids used as local anesthetics. The maximal tolerated dose is 7.5 milligrams and the minimal lethal dose 10 milligrams. The maximal tolerated dose of cocain as well as the minimal lethal dose is 12.5 milligrams. The maximal tolerated dose of apothesine as well as the minimal lethal dose is 20 milligrams. The maximal tolerated dose of novocain is 45 milligrams and the minimal lethal dose is 55 milligrams.

Personal Experiences in the Use of Regional Anesthesia

During the past eighteen months I have been doing practically all of my operations under regional anesthesia and in many cases I have used as much as fifty grains of novocain without the slightest toxic symptoms. Therefore, in the light of these experiments and a clinical experience in something over three hundred cases, I feel that novocain solution can be used in sufficient quantity to do any major operation, with perfect safety.

There are many elements that must enter into the successful use of regional anesthesia. The specialist who administers local anesthesia for the surgeon must necessarily expect a larger percentage of failures than the surgeon anesthetist, for the reason that the delicate handling of tissues must be developed to the highest degree by the operator. The psychology of the surgeon, anesthetist, and patient, must coordinate.

It is also necessary that the operating room nurses receive special instruction in their work. No rattling of pans and instruments; no talking, except by the surgeon and anesthetist—the anesthetist entirely with the patient and the surgeon to his assistants and nurses.

A new nomenclature for all instruments must be established and all nurses and assistants thoroughly acquainted with these new terms. For instance, when desiring a knife, the surgeon should use a term similar to this: "Bard-Parker", etc.

In doing major surgery with regional anesthesia, at present we have quite a large nomenclature of available technics:—*viz*: Spinal, caudal, transsacral, parascral, paravertebral, nerve-block, intraneural, splanchnic and infiltration. Any one, or more, of these various technics must be combined to properly anesthetize the field of procedure, depending entirely upon the nerve supply of the region to be operated.

Therefore, you can readily see that the first requirement of the local anesthetist is a thorough knowledge of the nervous system. He must go a little beyond the text-book knowledge of the system, and be able to visualize the entire ramification of the nerves in the region to be anesthetized.

It is not my purpose in this paper to go into the technic of any one of these divisions or operations. However, I would like to call to your attention the fact that the advantages of regional anesthesia are many—both to the surgeon and the patient. Complete relaxation of parts, especially in abdominal and pelvic surgery, it rarely being necessary to use packs in the abdominal cavity. The intestines are relaxed and flaccid, and will, by properly manipulating the operating table, fall away from the field of work.

The patients are rational at all times.

Shock is almost unheard of, even in the most grave procedures. Nausea, vomiting, and gas pains are practically *nil*.

The patients can take nourishment the same day of operation.

The bowel and kidney functions are undisturbed.

A sufficient number of cases have already been reported to give regional anesthesia a high place in the realm of anesthetic methods, and I believe that anesthetists and young surgeons of today should lose no time in thoroughly acquainting themselves with its available technics, their scope of utility.

WEST BLDG.

Sedimentation Test in Gynecology and Obstetrics. J. L. BAER and R. A. REIS, Chicago. *American Journal of Obstetrics and Gynecology*, September, 1925.

Baer and Reis present the results of a study of 192 sedimentation tests carried out in 100 gynecologic cases. The sedimentation test is useful in determining the presence or absence of infection in the body. With pathologic conditions of the pelvis, a negative sedimentation test,—a sedimentation time over two hours—conclusively rules out pelvic infection. The rate of sedimentation is directly proportional to the virulence of the infection. The test is a further aid for determining the safe time for operation. The sedimentation test seems a more delicate prognostic index, good or bad, than either the leukocyte or temperature curve.

Diabetic Coma, Renal Element in. W. W. PAYNE and E. P. POULTON. *Lancet*, September 26, 1925.

Eleven cases of diabetic coma are reported by Payne and Poulton and certain cases are reviewed from current literature. A definite renal element, as shown by oliguria, albuminuria and urea retention and failure to excrete ketone bodies, and occasional sugar, is present. In some cases this renal failure is so decided as to cause a marked resemblance to uremic coma. The cause of the renal failure has been discussed. The treatment is carried out by means of large injections of insulin, and by the administration of much fluid, containing dextrose, by the mouth.

IMPORTANCE OF CO-OPERATION AND TEAM WORK BETWEEN SURGEON AND ANESTHETIST.*

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In presenting this subject there is nothing new to be brought out, but I wish to impress a few facts I have observed, as there has been little written to bring the Surgical Team close together and in so doing making surgery safer and accomplish a greater degree of relief with the least degree of risk.

I shall approach this from three angles: (1) Preoperative Evaluation, (2) Operative Protection and (3) Postoperative Care and Therapy.

By mutual confidence existing between surgeon and anesthetist and long co-operative experience many fatalities could be converted into successful outcomes.

By surgeon and anesthetist consulting with with each other frequently as to the patient's pulse, respiration, blood pressure and nature of operation proposed, the procedure can be better outlined and proper preoperative preparation applied, so that less time may be consumed when the time comes for operating, as the anesthetist then has a better knowledge of the existing condition, consequently he is better qualified for judging the patient's condition as the operation progresses and of keeping the surgeon constantly informed as to his condition.

PREMEDICATION.

When an internist has not already worked up the case, which is usual in well organized surgical teams, the anesthetist should see to, or make necessary examinations and treatment. Especially is this true in the poor risk when time will permit. In addition to the usual physical and urinalysis tests, the blood pressure, basal metabolism and breath holding test should be made and proper premedication applied to suit the individual case. Here I may add, I like my patient well narcotized when there is no contraindication before starting the anesthetic, as it lessens the psychic shock and fear to begin with, thereby requiring less anesthetic to induce anesthesia and maintain same.

For the past four or five years I have been using the following preoperative medication, subject to variation to meet the need of the individual case:—Chloretone grs. v to x to be taken at bedtime the night before day of operation, this dose to be repeated 2 hours before the hour set for operating. One hour and 10 mins. before the hour set for operating, Pantopon grs. 1/6 with Scopolamin grs. 1/300 in 2 cc. of 25% solution of chemically pure and sterile Magnesium Sulphate. In 20 mins. this is repeated with the exception of the Scopolamin which is given in a dosage of 1/400 grs. In 20 mins. again, if the patient is not already drowsy, the Pantopon and Magnesium Sulphate solution are repeated. There seems to be some discussion just now as to there being such a thing as synergistic anesthesia. Be that as it may, the mentioned combination harmonizes well in my experience and I can see no reason for changing.

*Read during the Fourth Annual Meeting of the Southern Association of Anesthetists with the Southern Medical Association, Jefferson Hotel, Dallas, Texas, November 10-11, 1925.

POSTURE AND RELAXATION.

With the mentioned preoperative preparation, I prefer the patient being placed on the operating table in as comfortable a position as possible to conform to the proposed operation, before starting the anesthetic, and during the procedure the position should be arranged to suit the surgical needs for that particular case. The anesthetist should familiarize himself with the various steps of the operation, particularly as they relate to manipulations requiring relaxation and to the approaching time of closure of the abdominal wound. Nothing is of more importance here than long co-operative experience and I would like to add, I know of no better training for all surgeons than for them to do some work under local anesthesia, as it teaches them to master a velvet steady touch with all tissue but more especially while within the abdominal cavity.

We anesthetists can do much in placing patient's head in proper position, so as to secure a clear airway and remove all obstruction possible.

Also if a small pillow is placed under the small of the back and under the knees while in the dorsal position, much of the postoperative discomfort of backache so often complained of will be relieved and at the same time better relaxation will be obtained and greater exposure secured for the surgeon.

In goiter work we always elevate the head of the table and place a roll or small pillow under the shoulders to extend the patient's head backward so as to secure the best exposure possible for the surgeon and a clear airway can usually be maintained and with light anesthesia of ethylene and oxygen, supplemented with novocain locally in some cases, there is usually little disturbance.

In tonsil work also, a small roll similar to that used in goiter cases is used with the patient in the dorsal position and head extended backward, a clear airway may be maintained and there is little danger of fragments of tonsils and adenoids being aspirated, which is still further lessened by

the use of the aspirator. I have found in a few instances, patients who would not breathe with the mouth gag widely opened. It mattered not what position head, jaws or tongue are placed in and not until the gag is released a notch or two will a clear airway be obtained. Different operators desire different stages of anesthesia, but by long co-operative experience the anesthetist can maintain the stage desired to suit the operator.

In brain surgery most of the patients are in the prone position with the head flexed forward placing the anesthetist in a very straining and uncomfortable position, often lasting four or five hours, but by the use of a motor blower, or a continuous flow, gas-ether machine, and mouth hook or mask strapped to face, light ether-oxygen vapor anesthesia may be maintained after the dura is opened without much discomfort to the anesthetist and at the same time he is in a better position for watching the pulse, respiration and blood pressure.

Other Operative Procedures

In cleft-palate, hare-lip, antrum, submucous resection and such operations, the anesthetist can do much toward assisting the surgeon by proper position, free airway; and in extractions, if the patient is in the dorsal position, a fluffy piece of gauze packed lightly in the patient's mouth to prevent the possibility of fragments of teeth or fillings from being aspired, may save both the operator and anesthetist a great deal of worry and anxiety or possibly a damage suit. In the cleft-palate and hare-lip cases, with patients a few days old, I always run them very light which stage is most agreeable with the operators with whom I work, and here again long co-operative experience is of importance. To date, I have no reason to change my method in these cases.

In chest surgery I prefer the pressure with ethylene-oxygen or nitrous oxid-oxygen anesthesia. By the surgeon constantly keeping the anesthetist informed as to progress, proper pressure may be applied to keep the lungs inflated in order to prevent artificial pneumothorax. Light anesthesia is usually all that is necessary after rib-resection.

Gall bladder surgery involves probably the the most difficult cases we have to deal with in securing sufficient relaxation, thereby aiding the surgeon in obtaining the best exposure and in so doing we sometimes have to run our patients more deeply anesthetised, for a time, than we like.

In abdominal surgery, again by long co-operative experience, we can better gauge the depth of the anesthetic to secure the proper relaxation for the surgeon and case in hand, thereby reducing the use of the Trendelenburg position in a large number of cases.

Of all cases requiring close co-operation, team work is most vital in old prostatics, where time may mean the difference between life and death. Thankful to say, the mortality has been reduced wonderfully in recent years by more attention being paid to the preoperative care and treatment, and closer team work at the time of the operation.

As to the postoperative care and treatment much can be done for the patient by free consultation with the surgeon as the anesthetist has been in constant touch of every pulse beat and respiration throughout the operation, consequently he is in better position to know the patient's condition than the surgeon. Other than seeing that patients are placed in bed in as comfortable position as consistent with the operation and administering stimulants or other medication to meet the case in hand and the usual nursing care there is little left for the anesthetist to do.

In closing may I urge that a more mutual co-operation between our surgical teams be our aim, thereby converting many fatalities into successful outcomes and forming closer fellowship.

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Acetonuria, Postoperative. Factors of. M. Rabinovitch. *Russkia Klinika*, March, 1923.

Rabinovitch believes that the severe diet as well as emotional shock preceding the operation play an important part in the occurrence of postoperative acetonuria. The latter does not depend on the amount of blood lost, the kind of anesthetic, nor on the duration of the operation. Young persons and women seem more predisposed to postsurgical acetonuria. This complication is not grave.

Vaccines in Surgery. A. Galindez. *Semana Medical*, July 2, 1925.

Galindez' experience in 100 cases confirms the advantages of preliminary injection of a polyvalent vaccine before operations. He injects 1 c.c. of the vaccine three days before the operation and 2 c.c. the day before. During the year since this has been his practice he has had no instance of pulmonary complications—an unprecedented freedom from postoperative mishaps. His list includes abdominal operations and others for mastitis, leg ulcers, and ambulant affections.

Intracardiac Injections of Epinephrin. F. Speciale. *Policlinico*, August 17, 1925.

Speciale introduces the needle 2 cm. from the margin of the sternum, and prependicularly, grazing the upper margin of the fifth rib. In a clinical case with prompt recovery from chloroform syncope after injection of 2 mg. of epinephrin, and in ten cadavers the needle entered the left ventricle. This allows the injected drug to pass directly to the central nervous system without the delay of passing through the minor circulation first. By this means the faintest throb of the heart is utilized for action on the respiration centers, as well as on the heart itself.

THE USE OF MORPHIN BEFORE AND AFTER OPERATION: WITH SPECIAL REFERENCE TO POSTOPERATIVE COMPLICATIONS.*

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In spite of the fact that morphin has been used both before and after operations for several decades there remains much to be learned concerning its actual effect on the patient, particularly as regards its influence on the prevention or treatment of postoperative complications. The diversity of opinion among surgeons and anesthetists, existing so long, has prevented to a great extent, unanimity in the definite indications or contraindications for using morphin as a preoperative or postoperative measure.

Difference of Opinions

On account of the confusion that covers this important subject I cannot but feel a little hesitancy in bringing before this meeting of anesthetists my thoughts on the matter. In a paper recently published[1] an attempt was made to show the sentiment of the surgical profession on this subject. This article brought out the fact that there is more or less general agreement that morphin can and should be used with safety both before and after operation. However, there remains a rather strong minority who still feel that the drug can be wholly dispensed with. This latter group of surgeons unquestionably fail to consider the comfort of their patients when the weight of opinion seems adequate proof that the effect of morphin before or after operation adds nothing to the risk of the case.

The problem then, seems to resolve itself into whether or not morphin can be used *with safety*, rather than a settlement of the question of the beneficent effect of the drug, which latter admits of little argument. It is my feeling that the surgical profession has, in the past, been somewhat derelict in failing to carry the discussion of this timely subject before such an association as yours. The assignment to me of this subject by your chairman gives me an opportunity that should almost certainly bring about fruitful discussion. The trained anesthetist is in a far better position than the surgeon to observe the effects of any drug during the administration of an anesthetic, whether good or bad. Therefore, we should confidently look to the anesthetist for assistance in solving this question about which there exists no little confusion and disagreement.

*Read during the Joint Meeting of the Eastern Society of Anesthetists with the Mid-Western Association of Anesthetists, Philadelphia Academy of Stomatology and American Society of Regional Anesthesia, Hotel Adelphia, Philadelphia, October 26-30, 1925.

Various Views

A review of the literature shows it to abound in articles dealing with a multiplicity of technics for the administration of morphin alone and in combination with other drugs, both pre- and postoperatively. Moreover there is an astounding lack of research work upon the subject. Since this is true and as there is so much diversity of opinion only a brief reference to the literature seems indicated.

O'Keefe[2] stresses certain advantages of using morphin and scopolamin before operations. He believes that by using these drugs much of the anxiety and unrest occurring between the patient's room and the operating room can be avoided, as well as the discomfort experienced by the patient while going under the anesthetic. This alone justifies us in using the drug. Further, he asserts that the amount of ether will be less, the induction quieter, and the postoperative course smoother when preliminary doses of morphin and scopolamin are used. O'Keefe's technic is simple enough, although not possible in all instances. This includes a quiet room, plugging of the ears, almost complete darkness, and absolute quiet after the effect of the drug commences. This writer quite correctly cautions that the action of morphin varies greatly in individuals, the small, poorly nourished patient requiring a much smaller dose. When this caution is not observed alarming consequences may be expected. He also brings out the fact that the combination of morphin and scopolamin has the advantage over morphin and atropin of requiring less ether and causing less gastric disturbance.

Davis[8], on the other hand, seems to take a rather pessimistic view regarding the value of morphin as a preliminary to operation and following it. In an excellent article he emphasizes the fact that morphin retards peristalsis and causes constipation. Also acute dilation of the stomach may follow its use. In my own experience the latter is exceedingly rare, and the former adversely disturbs the mind of the surgeon and patient rather than being productive of any serious harm. He concedes that morphin has little influence on producing nausea, vomiting, gas pains, and tympanitis, believing that the causative factor can be found in the depth and duration of the anesthetic. With this view I am heartily in accord. Further, he attributes urinary retention to peritoneal injury and improper anesthesia rather than to morphin, as is erroneously supposed. In summarizing, Davis states that morphin before operation will not prevent shock, that it has no effect on immunity, that it imposes one powerful depressant of the medullary centers

upon another—ether. He advocates that its use preoperatively be abandoned and that postoperatively it should be only used where acute suffering can not be controlled otherwise. As it is only the exceptional patient that suffers no pain after operation, and as few if any other drugs will bring relief, one wonders just what cases are referred to.

Glass and Wallace[4] believe that the effect of morphin can be so lengthened by combining it with magnesium sulphate preoperatively, that there will be none required after operation. These writers apparently are convinced that morphin when given before operation will greatly lessen the incidence of intestinal paresis, acidosis, nausea and vomiting. In addition there will be required less ether, and bronchial and renal irritation are reduced to a minimum.

From the foregoing opinions it can be seen that much disagreement prevails as yet.

Preoperative Use

Morphin is so universally used before operation that little comment here is indicated. However, it might be well to briefly enumerate a few reasons why the patient appears to benefit by its use. Morphin certainly lessens the unpleasant sensations experienced by most patients while *en route* from their beds to the operating room. I fear that those of us accustomed to hospital sights and smells, are too prone to minimize the profound impression that this journey makes on the average patient. If a dose of morphin tends to diminish or prevent this psychic shock let us not deprive our patients of this comfort.

I feel confident that this association will agree that morphin is a great aid to the expert anesthetist, and yet not at the expense of safety to the patient. In fact the drug appears to prevent preanesthetic struggles, to diminish the amount of ether or other anesthetic required to obtain surgical narcosis, and to hasten muscular relaxation, a condition so necessary for assuring safety to the patient.

In the treatment of shock we depend largely on the administration of morphin. Therefore, it is not illogical to assume that its use before operation does much to diminish or prevent surgical shock. This view is upheld by those investigators who have done so much to place the pathological aspects of this condition on a sound basis.

Postoperative Use

The most important single indication for morphin after operation is for the prevention and relief of pain. If it could be stated with certainty that this drug exerted no unfavorable effect upon the patient, few, if any, surgeons would deny their patients this surcease from pain. However, there yet remains in the minds of many a fear of the drug which would not appear to have a rational basis. That many will take exception to this statement is not unlikely. Nevertheless any opinion to the contrary lacks scientific proof. It is my conviction that we have no right to allow patients to be tortured with pain for the first day or two after operation when there is available a remedy for relief, that, when given judiciously, manifests no harmful effects. I am quite aware that, there are those who will attribute a whole host of unfavorable symptoms to the use of morphin postoperatively. Such a list would include vomiting, tympanites, gas pains, constipation, ileus, and retention or suppression of urine. In addition drug addiction and idosyncrasy would surely be mentioned. When this group of unfortunate complications can be shown to my satisfaction, to follow the use of morphin only, I shall discontinue the practise of using the drug.

There would seem to be a great deal of evidence that morphin will prevent postoperative shock, if given in small doses and at proper intervals after operation. While part of the credit for the diminishing incidence of this tragic condition must be given to expert anesthesia and careful operative technic, no small part of it belongs to the morphin.

It is an accepted physiological fact that morphin is the best circulatory sedative that is known. It is then, a reasonable deduction that the drug will lessen the liklihood of postoperative hemorrhage, a condition that is seldom seen nowadays.

The statement is often made that because morphin lessens peristalsis its use is contraindicated after abdominal operations. To this rather dogmatic opinion I cannot subscribe. Since both anatomic and physiologic rest are greatly to be desired in these cases then a splinting of the bowel would appear to be a benefit to the patient rather than a menace. It is for just this reason that morphin has been found to be the drug *par excellence* in the treatment of peritonitis. Furthermore since this latter condition is the most feared of all postoperative abdominal complications it follows that morphin, through its splinting action on the bowel, has much to do in preventing the spread of any infection that may be present.

It is highly improbable that the customary small doses of morphin given for one to two days after operation are in any way a causative factor in the production of drug addiction. In my recent paper[1] the questionaire showed 92.5 per cent of those

answering to have no personal knowledge of a single case of morphinism due to the drug being used postoperatively.

It is true that a small but definite number of patients show an idiosyncrasy to morphin. However, no danger attends this condition, and while it has its annoying features, it can not be said to constitute a contra-indiction to the use of the drug.

Postoperative Complications

Among the complications ordinarily occurring after operation pneumonia occupies a place of prominence. Personally I take exception to the use of the term pneumonia as applied to this class of cases. Sufficient evidence has accumulated to warrant giving up this classification. E. C. Cutler and his co-workers have shown that practically all of the acute postoperative respiratory affections are caused by showers of emboli and, while the symptoms do simulate in part true pneumonia, they lack enough of the classical features to compel us to properly label them as multiple infarcts. It is very unlikely that morphin, whether given before or after operation, is a factor in any respiratory complication.

A discussion of those complications taking place in the abdomen is bound to provoke considerable controversy. If nausea and vomiting can be dignified by being termed complications it is important to determine, if possible, in what manner morphin influences them. So many factors enter into the causation of these distressing conditions that it is well nigh impossible to say with certainty that morphin either increases or decreases the patient's susceptibility to them. However, it has been my experience that the drug will render a patient less liable to vomiting or nausea when given both before and after operation. Particularly does this seem so in gall-bladder cases, in which these complications are notoriously common. By way of explanation, as to the reason for this favorable effect, I can only say that the drug must deaden to some extent the vomiting reflex. I am well aware that many surgeons are of the opposite opinion. Nevertheless it can be safely said that the majority of men doing surgery use morphin after operation without fear of it producing nausea or vomiting.

I will state without fear of contradiction that the use of morphin bears no relation whatsoever to postoperative ileus. If such were not the case this catastrophe would occur to haunt us more often than it does.

It has long been asserted by some surgeons that renal dysfunction may be encountered in a number of cases when morphin is given. There is no satisfactory evidence to prove this. If care is taken to provide the patients' tissues with adequate water before and after operation, urinary suppression will not occur except perhaps in those cases in which the renal tissues are already severely damaged.

All of the foregoing complications, together with many others, which time forbids discussion of, have been noted many times in patients who have been denied morphin. I do not think we are in possession of enough proof as yet either to advocate strongly or condemn morphin *per se*. However, until there accumulates sufficient weight of evidence to show that the drug is a factor in the etiology of postoperative complications, we have not the right to deny its use to our patients. Furthermore, I am convinced that future research will have a tendency toward encouragement in using morphin rather than the reverse.

Conclusions

In an attempt to state my position in the case of morphin as used before or after operation, I have perhaps failed to consider properly the anesthetist's viewpoint. If such is the case I may be excused on the ground that a discussion of this subject appeals to me strongly from a surgical standpoint and also that I am too poorly versed in the art of anesthesia to venture along paths well-known to you.

There exists a very definite need for research into the problems outlined in this paper. It is unfortunate that so little agreement on the subject prevails. At least it is time that widely divergent views are investigated and some standard be set as a guide.

Postoperative complications are little influenced by the administration of morphin. However, the significant point to remember is that the drug, at least, does not in itself act as a cause of complications.

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References

1. Slocum, M. A.: Morphin: Its Use Before and After Operations. *Jour. A. M. A.*, April 25, 1925.
2. O'Keefe, C. D.: *Jour. Mo. State Med. Soc.*, April, 1923.
3. Davis, Benj. Franklin: The Relation Of Morphin to Postoperative Complications and Immunity. *Jour. A. M. A.*, January 22, 1916.
4. Glass, S. J. and Wallace, H. S.: Preoperative Treatment For Postoperative Comfort. *Jour. A. M. A.*, January 7, 1922.

Blood Pressure at High Altitudes. M. Grossman. *Zeitschrift für klinische Medezin*, August 20, 1925.

The rise in blood pressure at high altitudes can be counteracted in many persons by increasing the oxygen tension. Grossmann concludes from this observation that the rise must be due to a deficiency in oxygen. The point attacked is the tissue of the vasomotor center; the arterial blood may show a normal oxygen tension, and acidosis may not be demonstrable.

GLUCOSE-INSULIN THERAPY IN NON-DIABETIC ACIDOSIS.*

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While the fundamental nature or exact cause of acidosis is as yet problematical and obscure, yet the condition is regarded as a definite clinical entity. It has long been recognized as an important complication in those suffering from diabetes as well as an alarming condition when present in the non-diabetic. Its presence in certain preoperative and postoperative conditions, the infections, starvation, cyclic vomiting of children, and the toxemic vomiting of pregnancy, is an established fact. It may occur as a complication to any of the diseases or appear without apparent cause.

THE MECHANISM OF ACIDOSIS.

Acidosis results when there is insufficient utilization of carbohydrates by the body to completely oxidize the fats and proteins, and the incomplete combustion of these results in the formation of by-products—ketones. In the diabetic there is an altered metabolism producing acidosis, and here insulin controls the glycosuria, hyperglycemia, and rapidly relieves the acidosis. It seems then that an altered carbohydrate metabolism is essential to the production of acidosis, and insulin supplies the factor which is lacking to bring about the complete utilization of the carbohydrates. Disease is not the fundamental in the formation of acidosis, but any state causing inability of the body mechanism to properly utilize sufficient carbohydrate to completely burn the necessary fats will produce acidosis. Then an altered metabolism caused by an insufficient carbohydrate intake (starvation) will, and does produce such a state.

It has been shown by Stehle and Bourne, who also quote the work of Lange and Müller, that during the course of narcosis as produced by certain of our anesthetics there is a lowered alkali reserve since phosphoric acid is liberated from the muscle tissue unaccompanied by an equivalent amount of base. This enters the circulation partly neutralizing the alkali of the blood, in turn lowering the reserve and disturbing the carbohydrate metabolism of the liver. Therefore, it would appear that anesthesia might be a predisposing factor in the production of postoperative acidosis or an aggravating factor in an already present acidosis.

DIAGNOSIS

The classic picture of one suffering from severe acidosis is characterized by,—hyperpnea, anxious expression, irritability, restlessness, staring and sunken eyes, irrationality, vomiting, and even convulsions. This chain of symptoms and signs, I am sure, is familiar to each one of us present, but the diagnosis should be made prior to the appearance of this striking picture. Of course, the diagnosis may be determined by the presence of acetone in the urine or by the lowered CO_2 combining power of the blood plasma, but the simplest means of early recognition of the condition is the detection of the acetone odor on the breath. This is where acetone makes its first appearance and where it lingers longest. So, if one is familiar with its distinctive odor he may save himself much worry and useless anxiety by diagnosing early acidosis and relieving the condition before it has reached its more severe form.

The treatment of this condition has undergone very radical change during the past decade, and for many years it was thought proper to attempt neutralization of this acid state by the administration of alkali. Very large doses of sodium bicarbonate were given these individuals, many of whom were already unable to retain anything, resulting in further emesis and aggravating the acidosis. In spite of this vigorous and vicious therapy some survived, though many *passed on*. This treatment is mentioned simply to condemn it and ask that it be relegated to the archives of ancient medicine. Soda therapy has died a long and lingering death. Next in order of progress was the introduction of glucose in combination with soda which gave us our first little ray of hope, although later glucose alone was considered the ideal medication. Glucose therapy met with varying degrees of success and for the first time we were pursuing the correct line of treatment. Though nearer the goal of success, this, too, was unreliable—sometimes favorable, again unfavorable.

INSULIN GLUCOSE THERAPY

Insulin was discovered through research primarily for the relief of the diabetic and its successful and startling effect in clearing the acidosis of this malady led to its employment in preoperative and postoperative acidosis of non-diabetic origin. Here too it accomplished equally as spectacular results. The first use of insulin for this purpose is accredited to Thalhimer, who, in his first communication, reported three cases successfully cleared of acidosis by this means. It was about this time that the author became interested and in a previous article reported a series of fifteen cases of acidosis; two treated with glucose alone and thirteen with glucose-insulin. The results in the latter were miraculous, the acidosis was promptly relieved and the patients immediately improved with instant cessation of vomiting. The series included two patients who

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developed acidosis while receiving glucose (alone) by rectum, skin, and vein, but immediately upon the addition of insulin this complication promptly disappeared. This same experience has been encountered in subsequent cases with equally as satisfactory results. The cases which did clear up with glucose alone required a much longer time to do so usually necessitating from two to five days.

It is frequently possible in the mild form to arrest and clear the condition by the oral administration of carbohydrates in the form of orange juice or stick candy. However, in the more advanced cases the use of glucose 5 per cent by hypodermoclysis or 10 per cent intravenously, supplemented by insulin in the ratio of *one unit* to each 2 or 3 grams of glucose used, should now be the accepted treatment of this condition. One need not fear an overdosage of glucose for the excess is eliminated by the kidney. What is to be guarded against is the possibility of an overdosage of insulin, but even this is not alarming since the physican is armed with the specific antidote, glucose.

Given in this ratio, *one unit of insulin for each two or three grams of glucose*, the procedure may be repeated as often as is necessary depending upon the severity of the case and the urgency of the situation. I have seen a small child suffering from acute suppurative appendicitis with peritonitis and complicated by severe acidosis, receive within 24 hours five quarts of ten per cent glucose with corresponding doses of insulin. I am certain it was this heroic therapy which saved the child from death for these classes of patients formerly failed to survive surgical interference. For nearly two years now this glucose-insulin therapy has been the routine method of combatting all cases of acidosis in patients at the Charity Hospital of New Orleans, and I have yet to see a case of acidosis which failed to yield to this procedure.

Glucose is the remedy, but alone is unreliable, as the body mechanism due to its changed metabolism, in many cases, is unable to assimilate the carbohydrate. But, with the addition of insulin either subcutaneously or added to the solution the carbohydrate is made readily available and the metabolic processes are re-established—vomiting ceases, acetone disappears from the urine and breath, and the state of acidosis is instantly relieved.

Summary and Conclusions

1. The true cause of acidosis is uncertain, but its mechanism is dependent upon a changed carbohydrate metabolism, due to insufficient intake or lack of assimilation.

2. Acidosis may occur as a complication to any disease, starvation, or appear without apparent aggravating cause.

3. Acidosis may develop while patients are receiving carbohydrates by mouth, rectum, or vein.

4. Glucose therapy alone will clear some cases of acidosis but is uncertain.

5. Insulin insures the immediate utilization of carbohydrates supplied.

6. Intravenous administration of glucose-insulin is the most efficacious means of administration of this antidote.

7. Glucose-insulin therapy in the ratio of *one unit of insulin* for each two or *three grams of glucose* is specific for acidosis of any cause.

8. The procedure is simple, safe, sound, and may be repeated as frequently as may be necessary.

9. Its use has frequently transformed poor into favorable operative risks, and is a life saving procedure.

10. *This* use of insulin opens a far wider field of employment than in the treatment of the diabetic and its universal adoption is urged.

607 Maison Blanche Bldg.

Postoperative Pulmonary Complications. P. G. Boman, Duluth. *Minnesota Medicine*, August, 1925.

Boman directs attention to the high percentage of postoperative pulmonary complications and emphasizes the importance which pulmonary embolism and infarction play as the real etiologic factors, in postoperative pulmonary complications, and that other factors, formerly considered of prime importance, such as anesthesia, infection, preexisting lung disease, old age, debility and chilling of the body, are of a secondary nature.

Ephedrin, Clinical Value of. T. G. Miller, Philadelphia. *American Journal of Medical Sciences*, August, 1925.

Ephedrin is the name given to an active principle of an Asiatic drug *Ma Huang* (*Ephedra vulgaria* var. helvetica), has been used in the practice of medicine in China for more than 5,000 years. Ephedrin has general physiologic effects in man similar to those produced by epinephrin. It has, however, distinct practical advantages over epinephrin because of its more prolonged action and the fact that it can be administered affectively by mouth. Miller reports his clinical observations with this drug. In doses of from 50 to 125 mg., given orally or subcutaneously, ephedrin sulphate usually raises the systolic and diastolic blood pressure and decreases the pulse rate for a period of several hours. It also stimulates the heart action and has a tendency to increase the output of urine. It sometimes increases the basal metabolism. Its administration caused temporary improvement in two cases of Addison's disease, gave relief in the paroxysmal attacks of certain cases of asthma, relieved the subjective sensations in a case of urticaria, caused a disappearance of urticarial lesions in a case of serum disease, and produced marked temporary improvement in a case of circulatory failure incident to myocardial disease and the evacuation of an overfilled urinary bladder. In a single case of complete heart block it produced an increase in both the auricular and the ventricular rates and caused alterations in the character of the electrocardiographic tracings. Locally apaplied to the nasal mucous membrane, ephedrin causes prompt contraction which persists for more than three hours and has no local irritant effect. It is believed that the wide range of usefulness of ephedrin will be found in the treatment of asthma and of acute circulatory depression, and in the management of certain congestive nasal conditions.

PROSTATECTOMY IN POOR SURGICAL RISKS*

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During the past few years, prostatic surgery has been raised from a formidable operation, with a high mortality rate, to a most gratifying one with but few fatalities. This has been due —(1) to the recognition of the fact that a majority of these cases have uremic tendencies and require careful preliminary treatment; (2) improved technic, eliminating hemorrhage and trauma; and (3) the selection and use of a safe anesthesia.

SURGICAL TYPES

The vitality of these patients suffering from prostatic obstruction, either partial or complete, is usually at a low ebb, a condition which often makes the problem presented a difficult one for solution. As the obstruction may be due to—(1) a benign hypertrophy or hyperplasia of the prostatic gland; (2) an abscess; (3) various types of inflammatory tumors; or (4) a neoplasm, it is of importance that the condition present be learned as early as possible.

The acute form of prostatitis, which occurs most often in young men, due to gonorrheal infection, usually responds to medical treatment and should seldom be dealt with surgically. In the chronic type on the other hand, we find a marked fibrosis present due to the inflammatory changes following an infection and even though there be but a slight enlargement of the gland, it is capable of producing all the symptoms of an adenomatous overgrowth.

Prostatic abscesses often occur secondarily to acute infections of the gland, but as they usually drain into the urethra, they should seldom if ever be treated surgically. About 25 per cent. of prostatic enlargements and bladder tumors in elderly patients are malignant. Unfortunately the onset of the symptoms produced in these patients are insidious and prior to their recognition metastasis into other tissues is often present and renders surgical intervention ill advised. Even though metastasis is not present the discouraging results obtained practically excludes surgical treatment, except where a suprapubic drainage becomes quite necessary.

Fortunately the large percentage of the remaining enlargements are simple adenomas without any neoplastic changes, a condition which is greatly responsible for the possibility of obtaining complete and lasting relief in such a large percentage of cases operated upon. It is of interest to note that a uniform enlargement of all lobes is relatively infrequent. In fact a marked adenomatous development of one lobe may cause sufficient pressure on an adjoining one to produce atrophy.

SYMPTOMATOLOGY AND INDICATED INTERVENTION

The symptoms produced by these varied forms of enlargements are not always constant, but upon these depends the advisability of surgical intervention.

A slightly enlarged gland may produce marked obstruction with residual urine, while a large intravesicular gland often produces but slight mechanical interference. The indication for surgical intervention should be based entirely upon the symptoms produced. A large prostate unproductive of difficult, painful and frequent urination, hematuria, or residual urine, is of itself usually not surgical. But if irrespective of it's size the gland produces one or more of three symptoms, it becomes surgical. The size and nature of gland is readily determined by palpation through the rectum. Cystoscopic examinations are valuable for diagnosis, but should not be made if the condition of the gland makes it difficult, because of the possible trauma.

But the removal of the gland is not the whole solution of the problem. As a result of the obstruction, either partial or complete, other dependent lesions are produced, which tend to deplete the vitality of the patient, renders operative treatment more hazardous and forbids immediate intervention.

The presence of residual urine and associated kidney lesions necessitates due to precautions in order to prevent uremia. We must not lose sight of the fact that the patient is advanced in years and consequently his normal degree of resistance has been preceptably lowered. The loss of sleep, occasioned by the nocturia has further depleted his strength and the changes which have taken place in the whole genito-urinary tract and circulatory system as well as the remaining excretory organs all tend to lower his resistance. But patients with impaired kidney function can usually be built up so as to become safe risks for surgical intervention.

Kidney Function.—Unless some preliminary guide to determine the kidney function is used, an injustice is done to the patient and the former disastrous results will continue to occur. Recognition of the exact condition of kidney function as determined by the return of the red dye, and the varying degree of retention of urea in the blood, is of vital importance for the preliminary treatment necessary before enucleating the gland. Too much stress cannot be given to accurate blood chemistry.

Blood Pressure.—The blood pressure should be taken into consideration. A high blood pressure is preferable to a low one. When the kidney function has been re-established and a stable pressure has been produced, even though it be as high as 200 mm. of mercury, there will usually be no drop in either the systolic or diastolic pressure at the time of the operation.

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Drainage.—Mechanical drainage of the bladder which usually contains residual urine in varied amounts, proper hygiene taking of large quantities of water and fluids for a period of from five to thirty days, or longer if necessary, helps to correct this faulty elimination. Drainage can be effectively accomplished, either by a retention catheter or a suprapubic drain which then serves as the first part of a two stage operation. Regardless of which method is used the emptying must be gradual in order to prevent shock which is here more frequent and severe than in the enucleation. The sudden compression brought on by rapidly emptying of a distended bladder is often followed by unpleasant symptoms.

The work of Carlson and Luckhart on the visceral sensory nervous system, seems to be directly applicable and explanatory of this phenomena. To quote, "Of all the viscera in the abdominal cavity, the urinary bladder yields with greatest certainty on stimulation marked reflex effects on the heart and the vasomotor system. In any animal in good condition suitably prepared, the mere touching of this organ may cause promptly a long lasting cardiac inhibition and arrythmia with a lowering of the general blood pressure. Such an irregularity and slowing of the heart may under certain conditions be even more pronounced and long lasting than the inhibition effected temporarily by mechanical stretching of the horn of the bladder. Mechanical distention of a rubber balloon in the bladder gives the same phenomena."

A chronic over-distended bladder as found in these prostatics, brings into play a new mechanism, so that a sudden collapse of this bladder would tend to produce a similar reflex phenomena on the heart and vaso-motor system as would a sudden distention of a normal bladder. It is generally recognized that the rapid removal of urine from an over distended bladder may be followed by some very severe and unpleasant symptoms. A sudden reduction of the intravesicular pressure results in immediate congestion throughout the urinary tract with the possible resulting edema and hemorrhage which may in severe cases cause a complete suppression of the renal function by increasing the pressure within the renal capsule to a point incompatible with glomerular and tubular function. Therefore, it is of importance in establishing a suprapubic drain or draining the bladder by a catheter, to permit only a gradual emptying of the bladder. It has been found advisable to use a catheter drain whereever it is possible, and to reserve the suprapubic drain for patients who cannot tolerate the catheter and who do not improve with it's use.

There is much to be said for and against the suprapubic drain. If it is used, a purse string suture is placed in the bladder wall, high, near the fundus, and in the center of this circle is made a stab wound, into which is immediately inserted a mushroom catheter, stretched on an introducer. The catheter which expands and entirely fills the stab opening, is made doubly secure by tying the purse string suture. Thus the bladder which still contains urine can be emptied as desired and as the condition of the patient permits. During this period of drainage the patient is urged to take large quantities of water and fluids. After suprapubic drainage, the patient remains in bed for 24 to 48 hours when he is urged to be up and about several hours daily, for aside from aiding his circulation and general physical condition it has a tendency to improve his morale and buoy up his spirits. A depleted kidney function can thus be made to remain quite stationary.

We formerly believed that only a preliminary suprapubic drain would eliminate infection, but have since learned that the catheter drain is equally as effective. To enucleate the gland through an old suprapubic wound, necessitates a blind dissection, and makes bleeding more difficult to control. Because of the absence of infection in a two-stage operation as compared to the one, we were led to believe that a suprapubic drain was essential in the regular routine, but since we are obtaining equally as good results where only a catheter drain is used, we are now convinced that both methods result in ridding the bladder of an infection which was responsible for the foul sloughing wounds and the infections in the prevesical space. In either instance a gradual decompression is the important step of the preliminary treatment.

Methods for Removal

The anatomic location of the gland offers two methods for it's removal. Each has certain advantages and while some operators firmly adhere to one steadfast rule there are points in favor of both. Having a choice of two methods the surgeon who confines himself to only one and is unable to see the advantages of the other, is unnecessarily biased. It is a safe rule to follow, that if the tumor is large and projects into the bladder, the suprapubic route is he more advantageous, while if the tumor is of a fibrous nature and the bladder wall thick and retracted, the perineal is the more accessible. The former are often too large to be removed through the perineal route and the latter because of the dense involvement may offer great difficulties if attacked otherwise than perineally. The use of either method without due regards for it's fitness in each individual case will necessarily mean added difficulties of enucleation and as a consequence if ill-chosen, the already enfeebled patient may be unable to withstand the associated trauma. The surgeon should

be prepared to do either operation as indicated. Perhaps the most plausible argument in favor of the suprapubic route is, that the external sphincter is left intact, while in the perineal it is often injured and rectourethral fistulas are formed. It immediately approaches the median and lateral lobes where the hypertrophy occurs, permits complete exploration to treat associated lesions and to remove foreign bodies in the bladder.

Selective Anesthesia

Ether.—A wide exposure of the bladder to permit visual enucleation and control of hemorrhage is desirable and as a result the time element ought not to be necessary for consideration. For this reason the choice of a suitable anesthesia plays an important part. The use of ether, even in a minimum amount may have depressing effects on the kidney and also result in respiratory changes. Then, too, the hemostatic elements of the blood are not liberated as freely in the field of operation. Since abandoning it as a routine anesthetic, the results obtained have been more gratifying.

Spinal.—In spinal anesthesia, the time element need not be taken into account, but it is not unaccompanied by danger. The most marked effects of spinal anesthesia are, a rapid drop in the blood pressure and respiratory changes. The pulse may become weak and often impreceptable. In cases of old men with a lowered resistance, the rapid and marked fall in the blood pressure may produce a profound shock in which instance hemorrhage may become severe. The use of an intramuscular injection of caffein immediately prior to the spinal puncture is of a decided benefit in spinal anesthesia. Occipital headaches often follow and when present may be of great concern. The work of [2]Ingvar and Jacobeus[3] is conclusive of the fact that this is due to a gradual seepage and escape of spinal fluid at the seat of puncture. A spinal injection of salt solution in varying amounts has a tendency to alleviate this condition. The use of a small calibered needle is advisable to prevent much seepage. While later paresis and paralysis have been attributed to spinal anesthesia we have never noticed this to occur.

Sacral.—The introduction of sacral anesthesia has unquestionably been a factor in lowering the operative mortality following prostatectomy. This is essentially different from and should not be confused with spinal anesthesia. A thorough knowledge of the anatomy of the sacral region is necessary in order to block the nerves successfully. When anesthesia does not occur, it is direct evidence that the solution has not reached the intended nerve structure. Not infrequently the patient complains of a deep-seated pain during the process of enucleation, but it is of an ephemeral nature. However supplemental ether or gas may become necessary and should be used if indicated to augment the anesthetic and for pyschic purposes. But it's duration will then be of a short nature and not sufficient to leave ill results. One objection to transsacral and sacral anesthesia which must not be minimized is the danger of breaking a needle during the process of injection. Unpleasant experiences can be related by those to whom this has happened. The caution to use only good tested needles, needs to be greatly emphasized.

Preventing and Controlling Hemmorhage

Immediately after the removal of the gland has been completed the space formerly occupied by the prostate is obliterated. This is accomplished by placing the two raw surfaces of the capsule together after which firm compression is made by two fingers covered with gauze. The muscular fiber tend to contract and liberate hemostatic elements with the result that hemorrhage soon subsides. If, however, it does not subside readily by this method, other methods must immediately be resorted to. Too much emphasis cannot be placed upon the necessity of controlling hemorrhage. These patients can ill afford to lose much blood. Many a death attributed to uremia is really not uremia, but a physiological oliguria or anuria, due to hemorrhage, and can be relieved very readily by an immediate blood transfusion. This will save lives which otherwise would be sacrificed. The use of a Pilcher bag is very servicable. It has the additional advantage of permitting early removal of the suprapubic drain and primary union is more apt to occur. Stitching of the capsule may be necessary if other methods fail.

After hemorrhage has been amply controlled, a rubber tube one-half inch in diameter is fixed into the sinus and the bladder is then closed. Care should be used not to permit this drain to penetrate into the bladder far enough to allow the end to come in contact with the site of the enucleated gland as the resulting irritation may be sufficient to produce tenesmus. A rubber catheter is left in the urethra.

After the patient has been returned to his bed, the head of which is raised on 8-inch blocks for the two-fold purpose of obtaining better drainage and to prevent the possibility of a hypostatic pneumonia, a 5 per cent. solution of glucose by proctoclysis is given every alternate hour for the first 12 hours. After the first 24 hours, by which time the drainage from the bladder is usually clear and the patient is quite comfortable. He is now urged to take liquids in large quantities. Immediate irrigation of the bladder with a solution of 105°F. is of service but it's continued use has a tendency to wash away clots and may lead to a profuse secondary hemorrhage. Then, too, the constant flow carries with it quantities of blood, large enough to deplete the patient. Ample support of the scrotum is imperative. As the

seminal vesicles are usually infected in these cases, this precaution is of great importance and helps to prevent what in time would be sure to form an unpleasant epididymitis. The patient is urged out of bed into a wheel-chair as early as advisable, if possible on the third day. As a rule the urethra functions after the first week, when the suprapubic drain may be removed. The catheter should be removed on the third day. The wound is usually healed at the end of the third week. If, however, drainage through the wound continues over this period it is not necessary to hurry a closure for a longer period of healing does no harm.

51 N. Clarke St.

References

1. Carlson, A. J. and Luckhardt, A. B.: *American Journal of Physiology*, Vol., IV, No. 1, February, 1921.
2. S. Ingvar: *Acta, Med. Scandinavia*, **58**: 67-101, 1923. Abs. in *Jour. A. M. A.*, **81**: 175, July 14, 1923.
3. H. C. Jacabeus and K. Frumiere: Danger of Leakage of Cerebro—Spinal Fluid After Lumbar Puncture and it's Treatment. *Acta, Med., Scandinavia*, **58**: 102-108. Abs. in *Jour. A. M. A.*, **81**: 175, July 14, 1923.

Labor, Shortening, Value of Quinin and Pituitary Extract in. Ryan. *The Practitioner*, June, 1925.

Ryan states that having delivered more than one thousand women in childbirth, and having always striven to shorten labor by every conceivable means, he thought it might be of interest to record his deductions as to the method which he found most successful in the majority of cases.

In the following remarks he deals only with normal vertex presentations, for abnormal cases always present their own specific complications. His aim is to indicate a method which will cause rapid and full dilation of the os; it is then left to the practitioner whether he applies his forceps or not—meddlesome midwifery has its disadvantages, but to some its advantages are regarded as a blessing.

Having made certain that no obstruction to delivery exists, and then having considered it wise to hasten delivery, he suggests two alternative treatments. First, to give castor oil I ounce, followed by a hot drink, and two hours later an enema of soap and water; one hour later a cachet of quinin bihydrochlorid grs. v, the latter to be repeated every two hours till grs. xv have been administered. If labor does not come on strongly, hot fomentations applied over the abdomen usually bring on strong labor pains.

When the os is the size of at least half a crown (but not before), he gives a deep intramuscular injection of pituitary extract, 1 cc. Full dilatation usually occurs speedily with an uneventful delivery.

A second suggestion is that instead of giving the quinin in cachet form by the mouth, a 1-cc ampoule containing grs. v of quinin bihydrochlorid should be given intramuscularly once only, the castor oil and enema being given as usual.

The idea is not giving pituitary extract in the early stages of the first part of labor is based on the fact that pituitary throws the longitudinal fibers of the uterus into strong contraction, the circular muscles are only dilating slowly, and the result is a slight dilatation of the os, with a following temporary inertia. The quinin seems to act as a more lasting tonic to the longitudinal fibers, and prepares the way for the pituitary extract. At all events the use of both has always, in his own experience, shortened labor to a very considerable extent.

POSTOPERATIVE PSYCHOSIS.*

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Previous Reports

The occurrence of mental disturbances following operation was noted many years ago.

In 1819[1] Dupuytren described a condition of mental excitation which he called *delirium nervosum*, coming on immediately after operation. In 1842 Herzog described a case of mania following an operation for strabismus and in 1863 Sichel reported eight cases after cataract extraction.

In the early days of ovariotomy postoperative delirium was a frequent complication. Most of these cases were due to sepsis and the mortality was very high. There were also, however, true cases of psychosis, the first was reported by Von Courty in 1865. During the next twenty years cases were reported by Lossen and Fürstner, Barwell[2], Edis, Doran, Kelly, Tait, Spencer Wells and others.

From this arose the superstition that ovariotomy was the cause of the psychosis.

Rohé of Baltimore[3] analysed one hundred and ninety-six cases of postoperative insanity from the etiological standpoint. He found that the condition followed genital operations in sixty-five instances, cataract operations in thirty-five and various operations in ninety-six cases. The preponderance as regards sex was about four to one in favour of women. Sears of Boston[4], however, showed that in operations common to both sexes the proportion is about equal.

In 1885[5] Halliday Croom reported six cases following "simple, uncomplicated, successful operation in women without suspicion of hereditary taint."

In 1887[6] Savage, Medical Superintendent of Bethlem Asylum, read a paper before the Annual Meeting of the British Medical Association at Dublin. The subject was "Insanity following the use of Anesthetics in Operations" and in it he referred to five patients under his own observation. He blamed the anesthetic rather than the operation, but he stated:—

> One point needs further study; how long after an operation the effect of the anesthetic may be felt. In some of the cases referred to ,the symptoms followed at once and there seems little room for doubt as to the cause; but in others, hours or even days passed before any characteristic effects followed and I own it seems hard to connect these conditions.

Some years later in a paper on "The Relationship between the use of Anesthetics and Insanity"[7] he states that it is "rarely produced except in those who had previous attacks or who were predisposed by exhaustion or allied states."

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*Read before a meeting of the South Australian Branch of the British Medical Association, July 30, 1925. Courtesy of the *Medical Journal of Australia*.

Dent[8] considered the operation to be the causative factor in most instances, but that the immediate attacks were due to the anesthetic.

It seems unquestionable that mania may be set up by an anesthetic in persons free from any predisposition to insanity. No anesthetic known appears free from this possible risk. Here the cause is toxic not traumatic. Insanity, however, of this variety, follows directly on the administration of the anesthetic and persists. There is no quiescent period———But when complete recovery from the anesthetic has taken place and the mind fully reverts to and remains in its normal condition for a varying period, the anesthetic cannot be held accountable. Moreover, insanity has followed operation when no anesthetic was employed.

Younger[9] states that the severity or mildness of the operation seems to have little to do with the likelihood of insanity supervening.

An insane heredity is usually present. The condition mostly comes on in about three to seven days after operation, but in some cases it starts immediately afterwards and these I think are often due rather to the anesthetic than the shock of the operation.

Symonds[10] records four cases in all of which toxemia from disease was present. He said that the attack was usually of short duration and was as a rule cured in six weeks.

Macnaughton Jones[11] had seen only two women in whom symptoms of postoperative insanity appeared; one had previously been in an asylum and the other, an official in a private asylum, had been a typical neurasthenic for some years.

Silk[12] states:

Occasionally, at periods varying from a few hours to a few days after an operation, conditions may develop which, for want of any better explanation, are ascribed to the anesthetic, though it is not always by any means certain that the anesthetic is the sole cause of the trouble. For instance, patients with a previous history of insanity may develop an attack of mania or a recrudescence of their former mental state.

Probyn-Williams[13] considered that the condition occurred only in patients who had previously been insane.

Buxton[14] records an attack of acute mania following a herniotomy under local anesthesia.

Hewitt[51] Gwathmey[16] Webster[17] and others briefly mention the very rare occurrence of insanity following anesthesia, but record no cases.

Personal Report

I have two cases to record in which insanity followed operation under general anesthesia.

The history of the first case I shall give in detail as the patient was fully examined and treated by me for more than a month prior to operation. I administered the anesthetic myself and supervised the after treatment for some weeks. Then careful daily notes were kept by the nurse until normality was regained:—

Case 1.—On February 13, 1923, Mrs. S., aged thirty-nine years, consulted me on account of asthma from which she had suffered for ten years. The attacks usually occurred about once a month and always in September, October, November and December. Attacks were brought on sometimes by eating corned beef and possibly by contact with horses and gallardias.

She had suffered from diphtheria at the age of seven, pleurisy at thirteen, measles and bronchitis at thirty-four and had had many "bad colds on the chest." "Bones were removed from the nose" by a specialist six years previously without benefit.

Menstruation had commenced at thirteen, was regular every twenty-eight to thirty days and of three days' duration. There was no dysmenorrhea. She had never been pregnant, but was very anxious to have a child. The appetite was good, sleep was normal; the bowels acted daily without medicine.

On examination she was seen to be a healthy looking woman, rather plump and with well colored mucous membranes. The teeth were good and the throat showed no abnormality. The nose was narrow and the airway deficient, some scars were present on the septum. The ears were normal.

No abnormality was found in the heart, the pulse rate was ninety and the systolic blood pressure 130 millimetres of mercury and the diastolic pressure 84.

No abnormality was found in the abdomen. Pelvic examination revealed a small cervix, the uterus was infantile in type and in good position; the appendages were normal. The urine was clear, specific gravity was 1016, it was acid in reaction and contained no albumin and no sugar. The respirations were twenty-four per minute. Rhonchi and râles were present all over the chest.

She was advised to consult Dr. Jay about her nose and was given a mixture containing potassium iodid, tincture of stramonium and caffein citrate.

On February 19 she reported that Dr. Jay found polypoid degeneration on the right side of the nose and advised an operation. The râles and rhonchi were much less and there had been no further asthma.

On March 5 there were no adventitious sounds heard in the chest.

On March 16 anesthesia was induced by the open method eight cubic centimetres of ethyl chlorid and thirty cubic centimetres of ethanesal being required, the time taken was eight minutes. A change was then made to warm ethanesal vapor from a Shipway apparatus with a double airway. Dr. Jay performed a submucous resection of the nasal septum and also removed the anterior end of the middle turbinate and some ethmoidal cells. The duration of the operation was thirty-six minutes and the amount of ethanesal used was seventy-five cubic centimetres. The pulse

rate and respiratory rate before operation were respectively 112 and 24 and afterwards were 100 and 24.

Progress was uneventful till the night of March 18 when she told her husband that she was going to be very ill. She had no sleep, became very excited and said she was going to die. Next morning she was very excited, spoke foolishly and called out loudly. Bromides and morphin were given and she slept all night.

On March 20 she got out of bed and screamed. At Dr. Jay's request I saw her and she told me that she wanted to die, had no reason to live as her husband had shot himself and her brother also. She would not see her husband till she "gets to the other side." She had "died twice but was given poison and brought to life." She pretended to sleep and refused all food and medicine. Also she asked for her baby and said that the nurses would not let her have him.

On the morning of March 21 she appeared normal and complained of bad dreams. However, by night a depressed excitable condition had returned.

She was seen by her husband but she refused to recognize him as "he is dead."

On March 23 she began to take food and medicine again and allowed an examination to be made of her fundi, which were normal. She talked of bad dreams concerning Dr. Jay and complained of pain in the nose.

At 1 a. m. on March 24 she blew her nose violently and caused a severe epistaxis which necessitated packing the nose and an injection of morphin. She was quiet all day and slept at intervals.

On March 25 she was very talkative, called everyone "darling" and wanted to know if she would get better.

On March 26 she refused food even from her husband, as she thought it was poisoned. She complained of being unable to recollect previous events.

On March 28 food was again refused as the doctors, nurses and her husband were "conspiring to poison her."

On March 29 she was taken home somewhat quieter, but saying that she could not take communion as she still disliked the doctor. She was very suspicious that she was being taken to an asylum.

She became less excited during the next few days but still was convinced that she had a baby and dreamt that her husband was killed, but recognized him on waking.

By April 8 she was quieter and more normal and enjoyed a motor drive. She talked of going mad and of bad dreams. She wanted to know why the doctor was still visiting, if she was well.

On April 9 she was taken to a country hospital where her sister was matron, she was quiet on the journey and very tired after it.

For the next few days she was quiet except for occasions when she thought she was being poisoned or that other people were mad. She lost confidence in all her relatives.

From this time the rational moments became more frequent and longer. The baby delusion disappeared and she gradually took more interest in her surroundings, went for walks and motor rides. Still later she began to sew, do some gardening and play bridge. There were intervals still when she hated her sister, thought that she was being poisoned and that she had done some great wrong.

By May 12 she was normal and went to visit another sister in the country for a week, after which she returned home rational in every way. She has been quite well ever since and has had no asthma. She speaks to her husband of her illness quite calmly and can remember the details of it.

Reasons for the psychosis in this case are difficult to discover. There was no insane heredity and the patient herself appeared a very well balanced normal woman. Spasmodic asthma, however, is usually looked upon as a nervous disorder and Savage and Goodall[18] mention several cases in which insanity has alternated with spasmodic asthma. Hyperpyrexia and septic absorption have been suggested as casual factors, but the temperature chart showed only one reading as high as 38° C.

The only mental worries known were first that of four weeks anticipation of the operation and second the great desire to bear a child.

I also record a second case by kind permission of Dr. John Corbin.

Case 2—R. A., a plumber aged twenty-eight years, married, was admitted to the Adelaide Hospital on October 30, 1923, suffering from acute appendicitis. An immediate operation under ether anesthesia induced by the open method was performed by Dr. John Corbin. Purulent free fluid was found on opening the peritoneum, a perforated adherent appendix was removed and a rubber drainage tube was inserted. Three days later the tube was removed but had to be reinserted on November 11 as the temperature was still raised and drainage was poor.

On November 12 he began to call out in a loud voice and wept. Two days later he believed himself to be God, was very restless and called out.

From this time he sang nonsensical sentences all day long, but was not depressed.

On November 22 he was transferred to the Enfield Receiving Home.

I am informed by Dr. Penny that he gradually returned to normal in the course of the next few months and was able to resume his former occupation.

Toxemia and pyrexia may have been factors in this case as the temperature chart showed a raised night temperature for nearly three weeks.

Conclusions

1. Insanity follows a small percentage of operations under anesthesia.
2. An insane heredity is present in some cases; when this is absent there is often a predisposition from toxemia, exhaustion or allied states.
3. The incidence is slightly higher after operations on the genital organs.
4. The sexes are affected in equal proportion.
5. Insanity immediately following operation is due to the anesthetic.
6. Insanity occuring several days after operation is due to the operation itself.
7. Complete recovery usually takes place within three months. Some patients, however, die within a few days and a small percentage never regain normality.

References

1. Dupuyren; Quoted by L. R. G. Crandon: Surgical After Treatment, 1910, p. 277.
2. R. Barwell: Unusual Sequela of Ovariotomy. *The British Medical Journal*, March 21, 1885, p. 597.
3. George H. Rohé: Postoperative Insanity. *American Journal of Obstetrics*, Volume XXXIX., March, 1899, p. 324.
4. Sears, *American Journal of Obstetrics*, Volume XXXIX., March, 1899, p. 331.
5. Halliday Croom: *The British Medical Journal*, March 2, 1885, p. 517.
6. G. H. Savage: Insanity Following the Use of Anesthetics and Insanity. *The Lancet*, November 11, 1899, p. 1300.
8. Clinton T. Dent: Traumatism and Insanity. Dictionary of Psychological Medicine by Hack Tuke, Volume II., p. 1313.
9. E. G. Younger: Insanity, 1910, p. 91.
10. Charters J. Symonds: Postoperative and Puerperal Mental Disorders . *The British Medical Journal*, January 19, 1924, p. 110.
11. H. Macnaughton Jones: Manual of Diseases of Women, 1904, Volume I., p. 230.
12. J. F. Silk: Modern Anesthetics, p. 140.
13. R. J. Probyn-Williams: A Practical Guide to the Administration of Anesthetics, 1901, p. 32.
14. Dudley W. Buxton: Anesthetics and Their Administration, 1922, p. 148.
16. J. T. Gwathmey: "Anesthesia, 1924, p. 331.
17. W. Webster: The Science and Art of Anesthesia, 1924, p. 150.
18. G. H. Savage and Edwin Goodall: Insanity and Allied Neuroses, 1907, p. 438.

THE MEDICAL CARE OF TUBERCULOUS PATIENTS PRECEDING AND FOLLOWING SURGICAL OPERATION.*

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First of all I would like to express my appreciation of the honor you have conferred upon me by inviting me to participate in the discussion of the pre- and postoperative care of the tuberculous patient before this distinguished gathering of anesthetists. Not being versed in the recent marvelous advances of your specialty, I fear that perhaps my contribution may not be half as valuable as it should be. I can only tell you in a general way what precautions I would take if a tuberculous patient of mine should be operated and what I would like the anesthetist to do to help minimize the danger which is involved in any operation.

Preoperative Preparation and Hygiene

There must naturally be some difference in the preparation of a patient if he is to submit to a *general* or a *local anesthesia*. The preparation for a local anesthesia must differ according to the region of the body where the operation is to be performed. The general anesthesia being the most important, let us consider first for a moment what is essential to assure as safe an anesthesia as possible, particularly in a tuberculous patient.

I take it for granted that a good cardiac and general physical, and a satisfactory condition of the nerves has been assured, and thus possible unfortunate results guarded against: While I do not believe that there exists a special psychopathology in the average tuberculous patient, you will occassionally find one who is very nervous and very apprehensive. Sparing the patient the sight of the surgical instruments and the various preparatory movements on the part of assistants and nurses prior to the operation, will greatly aid in overcoming this nervous apprehension. I cannot help mentioning here the instructive experience I had some years ago when I took a thyroid patient to Cleveland to have her operated by Dr. Crile. All instruments were kept out of sight of the patient and the operation was performed in her bedroom. An injection of morphin prior to general anesthesia will help to assure the patient that he will neither feel pain nor even discomfort during the operation and that according to all human knowledge he will surely recover. Soothing words and the morphin will greatly help to overcome an agitated state of mind before the operation. The young physician who wishes to make anesthesia his specialty should train

*Read during the Joint Meeting of the Eastern Society of Anesthetists with the Mid-Western Association of Anesthetists, Philadelphia Academy of Stomatology and American Society of Regional Anesthesia, Hotel Adelphia, Philadelphia, October 26-30, 1925.

himself to talk in a quiet, pleasing and reassuring manner.

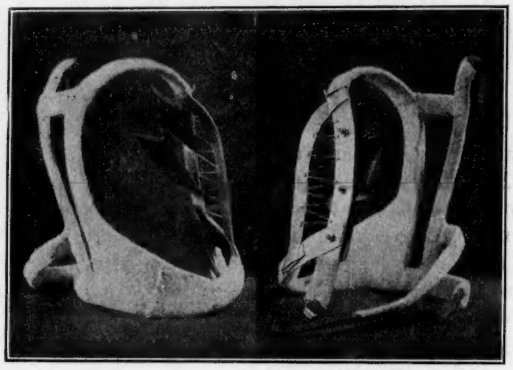
In any operation on the human body the surgeon will of course have attended to an aseptic field for his procedure, and he will direct the anesthetist when to commence and when to stop the inhalation of whatever anesthetic gas has been decided upon. Personally I am opposed to ether anesthesia for all kinds of tuberculous patients, but particularly in operations involving the abdominal or thoracic cavities, or the upper respiratory or digestive tracts. All operations on the head, throat, respiratory and digestive system should be preceded by a thorough cleansing of the nasal and buccal cavities. The greatest danger in operations of these regions is of course the development of a pneumonia which we designate as aspiration pneumonia.

One important measure to avoid the aspiration of infected material coming from bronchial secretions or cavities, consists in urging the patient to repeat morning pulmonary toilet once more an hour before the operation. Nearly all tuberculous patients cough more freely in the morning and expel profusely the secretions accumulated over night. This should be followed by an antiseptic gargle. During the recent war, it was my privilege to publish, by authority of the Surgeon General, an article entitled "Pneumonia Among Soldiers in Camps, Cantonments and at the Front." As a means of disinfecting and perhaps killing the virulent types of pneumococci in the nasal and buccal cavities, I suggested the following solution which had been recommended by Kolmer and Steinfield:

℞	Gm. or C. C.
Ethylhydrocuprein hydrochloride or quinin bisulphate	0.005
Liquor thymolis	5.0
Distilled water, sufficient to make	50.0

You are of course familiar with the fact that there are several types of pneumonia germs. This invaluable information has been obtained through the researches of the Rockefeller Institute which has shown that there are four distinct types of pneumococci; that acute lobar pneumonia is most frequently caused by Types I and II, and that Type IV is the pneumococci found most frequently in normal and healthy individuals and in secondary pneumonia, as for example that which often follows measles. According to Dr. Cole, the facts concerning the infection from Type III are still somewhat obscure. The number of cases due to this type of infection, however, is relatively small. Of greatest importance is the knowledge gained concerning Types I, II and IV in their relation to the factors which make the individual more or less liable to disease or increase the virulence of the pneumococci which have invaded the patient's system.

It may be well to continue this cleansing of the buccal and nasal cavities and the upper laryngeal and tracheal tracts several days after the operation so as to avoid the possibility of the innocent pneumococci becoming virulent.



Figs. 1 and 2. Forster's Plaster of Paris Jacket.

IMMOBILIZATION

In operations of the chest, particularly when a thoracoplasty is to be performed for a tuberculous lung, I recommend that prior to the operation the patient's comparatively healthy side, that is to say, the side opposite where the operation is to be performed, should be immobilized as far as possible by external compressions. I have learned from a number of thoracic surgeons whom I had asked about the usual location of aspiration pneumonia, that it is most frequently located in the non-operated side of the chest and usually begins in the relatively little invaded apex. I know of no better means to prevent it than to restrict the respiratory movements in that region. This may be done by strong adhesive straps after the method devised by Edison, or a Plaster of Paris jacket as devised by Forster of Colorado Springs (Figs. 1 and 2). This latter permits the compression of the apex or the upper lobe in part or entirely by means of inflatable rubber bulbs. The pneumatic chest splint (Fig. 3), or Sewall's belt (Figs. 4 and 5) and lastly, my own saddle bag (Fig. 6), which can be made in any size, may also serve. The latter consists of a weighted band placed across the side of the chest when the patient is in the recumbent position. By putting sand or shot in the containers, the weight can be regulated and it is placed so as to straddle the non-operated side and thus inhibit respiration. To retain it in place bands can be attached and tied. The patient should of

course be cautioned to avoid deep respiration as far as possible. In the prevention of aspiration pneumonia it is of great advantage if he has been taught to use only diaphragmatic respiration for some time before the operation, of which we will speak later on.

Fig. 3. Pneumatic Chest Splint Therapeutic Appliance Corp., St. Louis, Mo.

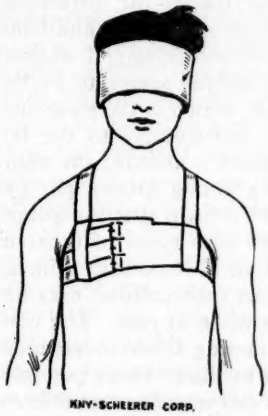


Fig. 4. Sewall's Belt. Anterior View.

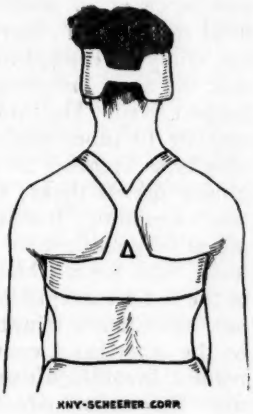


Fig. 5. Sewall's Belt. Posterior View.

There is also the danger of a patient vomiting during the anesthesia and the aspiration of food particles resulting in an aspiration pneumonia. As a preoperative precaution, therefore, the surgeon as well as the anesthetist should make sure that the patient's stomach is virtually empty, and in doubtful cases it may even be advisable to resort to lavage of the stomach prior to the beginning of anesthesia. The anesthetist should see to it that the foot end of the operating table can easily be elevated so that when during anesthesia he notices any diaphragmatic contraction indicating the possibility of the patient's vomiting, he could immediately raise the lower portion of the body and thus facilitate the expulsion of stomachic contents.

Controlling Postoperative Temperature

On rare occasions there may be a postoperative rise of temperature, a condition which of course should not be treated by heart-depressing remedies but by aerotherapy and hydrotherapy. It may not be possible to carry out the former as thoroughly with a patient in a general hospital as in a private room or sanatorium, but it is presumed that our modern surgical wards are well ventilated and if the patient's bed is surrounded by a cubicle or screen, the window of his cubicle may be opened sufficiently to supply his need for fresh air. I do not believe, however, that the operated patient should be made uncomfortable in midwinter on account of outside low temperature. Extremes should be avoided. The operated patient should never be exposed to the danger of being chilled. His body should be kept warm while he breathes fresh air.

If there is an appreciable rise of the patient's temperature, it may be well to resort to hydro-

Fig. 6. Knopf's Saddlebag to Restrict Costal Respiration. A weighted band placed across one side of chest when patient is lying down.

therapy by sponging the arms and legs with water at a temperature of 85 to 90° F. (or lower if the patient does not object), every 2 to 4 hours. The upper and lower extremities and perhaps also the abdomen should be wrapped in a Turkish towel and the water be allowed to be absorbed. The thorax should not be disturbed. In this way aero-and hydrotherapy may be judiciously administered while the patient is still in the surgical division of the hospital.

Further Therapy

After the patient is discharged from the surgical service, he will of course be out of your hands,

and to lead him to complete recovery he should be sent to a sanatorium, unless the home conditions are ideal and the sanatorium treatment can be carried out there under the care of a physician familiar with the hygenic, dietetic, aero-and hydrotherapeutic treatment of tuberculosis.

All cases of arrested tuberculosis should be considered as predisposed to further outbreaks of the disease and should be treated according to the seriousness, the location of the lesion, and the temperament of the patient. All patients will need aerotherapy, some mechanotherapy, some respiratory therapy, some massotherapy, some hydrotherapy, some heliotherapy, and last but not least, some psychotherapy. You will notice that I have omitted to mention climatotherapy. I omitted this in order to present my views on climatotherapy a little more in detail. Some patients will feel best in cool, some in warmer climates. Those inclined to dry catarrhal conditions will do well in moderately moist climates, those with moist catarrhs in hot dry climates. Where the individual patient can live outdoors the greatest number of hours of the day and the greatest number of days of the year in fresh, pure air, with the greatest comfort, is the ideal climate. Patients in poorer circumstances, as a rule, can not obtain those ideal conditions and they must be content with their home climate. They may, however, seek environment where the air is relatively free from dust and other impurities and obtain as much sunlight as possible. For tuberculosis of the bones and joints seacoast climate or high mountainous climate, where there is much insolation even in winter, have proven of great benefit in these types of tuberculosis.

Restricted Respiration

When a patient is expected to undergo an operation on the chest when the lesion is in the upper lobes or anywhere in the upper respiratory tract, it is well as a preoperative procedure to train him for several days in the abdominal type of respiration, already referred to. I began to study the value of this method while in service at the Veterans Hospital No. 61, where there were so many patients for whom artificial pneumothorax was not suitable and who were not willing to submit to the more serious Jacobaeus procedures, phrenicotomy, or the operation of thoracoplasty. For those not familiar with the less popular Jacobaeus operation, I wish to state that it consists in determining extent and location of the pleuritic lesions with the aid of a thoracoscope and cutting them with a galvano cautery. Phrenicotomy consists in the section of one phrenic nerve with resulting paralysis of one half of the diaphragm.

I have found the controlled diaphragmatic breathing of great value in all conditions where the restricted abdominal respiration is indicated. That for the purpose of limiting the danger of aspiration pneumonia there is no greater indication for such external mechanical restrictions as already indicated and the bradypnoea, or voluntary diaphragmatic respiration than in thoracoplasty must be evident. It may interest you to know what led me to the study of controlled diaphragmatic and reduced respiration. From the time of Dettweiler who started the rest cure on the reclining chair, down to Forlanini and our own Murphy of Chicago who invented the artificial pneumothorax, and to Jacobaeus and our present day thoracoplastic surgeons all phthisiotherapeutists have been eager to procure local rest for the lung. Even the general bodily rest in the main is only a means to that end. It occurred to me that by controlling the breathing we would have in addition to the external restriction referred to, another means for procuring local rest. From observing animal life and from the study of comparative physiology, I noticed that the slow breathing animal seems to be the longest lived. The rabbit, which is the most susceptible to tuberculosis, particularly to the bovine type, breathes 55 times a minute; the adult guinea pig 80 times; the young guinea pig 140 times a minute. It is well known that the guinea pig is very susceptible to both types of tuberculosis. The horse which, of all domestic animals, is the least susceptible to tuberculosis, breathes only ten times a minute when at rest. The cow, on the other hand, contracting tuberculosis more readily, breathes fifteen to thirty times per minute. The animal which never contracts tuberculosis and perhaps lives longest is the turtle, whose respirations are so few per minute that they are hardly perceptible.

Now, if the slowly breathing animal is least susceptible to the invasion of tuberculosis, and a lung infected by tuberculosis is benefited by restriction of its respiratory movements through outside pressure, or by the complete arrest of function by means of an air splint (artificial pneumothorax) or bone compression, why should not restricted respiratory movements and reduction in their number by voluntary effort be equally valuable as an adjuvant in the cure of pulmonary tuberculosis? I first experimented on myself, and by resorting to disphragmatic breathing have been able to reduce my respirations to eight, six, and sometimes five per minute, without discomfort. I recommended this to a few of my patients in various stages of the disease and I was surprised to find how well they could train themselves to reduce their res-

piratory movements from twenty-four and thirty per minute to ten, eight, and six. They began this gradually for ten minutes to half an hour and then to an hour at a time several times a day. The average active tuberculous individual rarely has less than twenty respirations per minute. If such pulmonary patient, resorting to this type of respiration reduces them only by half for 15 or 20 minutes several times during the twenty-four hours, so that the total amounts to about five hours, he will have saved his lung 3000 respirations, or 6000 movements, and his heart action will have been correspondingly quieted.

You will agree with me that such a procedure must be beneficial if taught to the patient prior to any operation on the upper portion of his chest or the upper respiratory or upper digestive tract. Teaching the slow respiration is not difficult. The best position for the patient to assume when learning the practice of controlled diaphragmatic breathing is to lie in or on the bed in a semi-reclining position, with feet extended and slightly separated, which position demands the least cardiac efforts against gravity. This position can be best obtained in bed by the use of 3 or 4 pillows, and later on may be imitated as closely as possible on the typical sanatorium reclining chair, by regulating the back of the chair so as to be at an angle of 30 degrees. It goes without saying that if the patient is dressed there must not be any garments that would restrict the free exercise of the diaphragm and abdominal muscles.

Before beginning the rest breathing it is presumed that as the result of the explanation and instructions given to the patient, he will be relaxed in mind and body. He is then told to imagine that the respiratory movement begins in the toes of his right foot, the inhalation gradually traveling upward as far as the diaphragm on the right side, then crossing over to the left, and gradually descending during exhalation downward to the left foot. While, of course, this breathing upward from the toes to the abdomen is merely imaginary, it results in a diaphragmatic breathing and whatever quantity of air is inhaled passes mainly through the lower portions of the lungs while the upper portions, where tuberculous lesions are usually located, are put, if not at complete, at least at comparative rest.

The patient must of course concentrate his mind on this procedure. He cannot and should not be thinking of anything else during this rest breathing period. The surest way to teach the procedure correctly is to ask him during inhalation, and during exhalation as well, to follow the physician's hand with index finger pointing, as it moves in the direction from the right toe upward and over to the left side of the diaphragm, then downward to the left foot. When the physician's finger has arrived at the left side of the diaphragm, it will pause while the patient may hold his breath a second or two, and then exhale during the downward movement of the finger. The relation of the duration of the two acts should be 5 for inhalation and 4 for exhalation. With some patients ten seconds may be spent for the cycle—5 for inhalation, 4 for exhalation, and 1 for stopping between inhalation and exhalation. With other patients, particularly the more advanced cases, it may be necessary to count rapidly and shorten the cycle. Nearly all patients are able to lessen the number of respirations per minute with absolute comfort by stopping after the exhalation three or more seconds before inhaling again. In fact, one may leave the duration of the interval between each cycle of the respiratory movement to the ability of the patient to remain quiet before inhaling again. If he is able to hold the air after inhalation longer than one second, he may do this also.

It will often be necessary to repeat this rest breathing procedure several times before the patient has fully grasped the *modus operandi* and does it correctly. A good way for the physician to assure himself that his patient has fully understood and mastered the rest breathing is, while indicating the direction and duration of the inhalation with one hand, to place the other over the upper portions of the lungs. He may thus observe whether they are at complete or at almost complete rest, and with his eyes fixed on the abdominal region see that the diaphragm does its work properly. Later on, by placing his own hands one on his chest and the other on his abdomen, the patient may learn to know whether or not he is doing the diaphragmatic breathing correctly and giving the upper portion of the chest the desired repose.

Before leaving the patient, the physician should count the number of respirations per minute with watch in hand, and thus see what can be accomplished. This is particularly indicated with highly nervous and dyspnoeic patients who must be shown what can be achieved with patience and perseverance in the reduction of respiraty movements. This class of patients take many short, jerky breaths per minute and seem to have no control over their diaphragm. They must be assured that they will learn with practice and may begin by stopping a few seconds after inhaling, which is the easiest part of the procedure. This mastered, they will learn to stop also a second or

two after inhalation and learn the use of the diaphragm.

We will now consider when and for how long a time and how often the patient should resort to this slow, controlled diaphragmatic breathing. If it is a bed case, he may be told that since it cannot do him any harm and that with every additional minute of rest he gives his lungs, his condition is bound to improve, he should do it whenever he feels like it, and as long a time as he enjoys it. It is rare that the patient, particularly at the beginning, can keep up his rest breathing continually for more than about fifteen minutes. Some can do it for only 5 or 10 minutes at a time, but as a rule, after an interruption of a few minutes, they can resume it for the same or a longer period. It does not tire them physically but before the diaphragmatic breathing has become automatic it may have required a good deal of thought concentration and frequent interruptions.

When the patient feels the need to take a deep breath he should not be afraid to do so. Ambulant cases, who are up and about but still taking the cure, should do the rest breathing whenever they can, particularly in the morning after awakening, during the day when having their rest hours, and in the evening before going to sleep. Ambulatory and afebrile cases, who, for one reason or another, are obliged to work, might take the rest breathing when in a sitting position and thus be able to do it without interfering with their work, and, of course, above all in the morning before rising, and in the evening after having retired. This breathing may also be practiced at night if a patient is wakeful. In many cases, if done quietly and regularly, it will be found conducive to sleep.

Controlling Cough

When in addition to the restricted respiratory movements the patient trains himself to cough only when the accumulation of pulmonary or bronchial secretion demands it, he will be doubly benefited. The suppression of the so-called dry cough may not only be relatively easily accomplished by will-power, but it may be materially facilitated by resorting quickly to the diaphragmatic respiration. Experience has shown that diaphragmatic breathing, after being practiced for a length of time, will become automatic and thus be of continued benefit to the patient until the complete arrest of the disease is accomplished and even protect him from the danger of a relapse.

If the patient has a persistent cought from no matter what cause, be it pulmonary, bronchial, or laryngeal, and his sputum is tenacious so that great exertion is necessary for him to get rid of his sputum, I know of no better means to liquify the sputum and make his cough easier than to give him with his meals an abundance of ordinary salt. It is probably due to an osmotic process that the sputum thus becomes less tenacious and the patient is made more comfortable. The administration of chlorid of sodium should begin several days prior to the operation so that the great effects may be felt afterwards and during convalescence. The physician and nurse as well as the patient must always bear in mind the distinction between useless and useful cough. It is of the greatest importance in the prevention of aspiration- and stasis-pneumonia to urge the patient not to suppress the cough with expectoration. In fact, after the operation let him cough as often as he can expectorate so as to get rid of the infectious secretions. By supporting the operated side with his hand or having the nurse do this, whenever he expects to cough, the pain and effort will be materially lessened.

Of all the operations I have witnessed, those where local anesthesia demands the greatest skill and foresight is in graded extra-pleural thoracoplastic operations. The patient's chest is opened under local anesthesia and two or three ribs are carefully resected and shortened at two or three different periods, the interval being from three to ten days. The patient is perfectly conscious, but in no other operation is the soothing and comforting voice of the anesthetist more essential than in this operation where physical and mental quiet are so essential. The patient feels what is going on although he does not see it; a screen between the field of operation and his eyes prevents that. He may have a little or some imaginary pains, and to distract the patient's mind will be the task of the anesthetist. He might tell the patient how brave he is and repeat to him what he perhaps says to every patient, that he has more courage and endurance than any one who has ever been on that operating table before. The patient may be told interesting stories but not such funny ones as may cause him to laugh. This will also help to divert the patient's mind from the operation.

I understand that among the men who have made anesthesia their specialty there are still quite a number who also do general practice, and to these I will say that now and then patients come under my observation whose cough is so persistent, even quite a while after the thoracoplastic operation, that I have had to resort to some cough remedy, and I am very happy to give you herewith my favorite prescription which I

believe is as effective as anything for obstinate cough:—

℞ Heroinae hydrochlor ----------gr. ij;
Acid, sulphuric. dil. ----------ɱ xlv;
Glycerinae ----------ʒj;
Aq. laurocerasi,)
Syrup. pruni virg.) aa ----------3 iv;
Aquae destillatae ------ q. s. ad. ʒ iij.

M. Sig. One teaspoonful every 4 to 6 hours; take less as cough subsides.

After having given you so lengthy a description of controlled diaphragmatic respiration you might wish to know something of the results obtained with its use. I have published many reports in a lengthy article wherein I also give the indications and contraindications for the method, and to those of you who are particularly interested I shall be very happy to send the reprint. I will however give one report here which came to me from that eminent clinician, Dr. George Dock, formerly Professor of Medicine of Washington University, St. Louis, now the chief consultant of the Barlow Sanatorium in Los Angeles. He wrote:

"I am especially interested in this method because I think you have shown a definite way of lessening movement in the part of the lung most affected as a rule. I look on the improvement of the abdominal circulation as of great importance and believe the psychological element introduced is of no little value . . . . This method is a useful addition to the class treatment of tuberculous patients. The demonstrations and questions raised give many opportunities for learning the many problems and inhibitions of the 'lunger'. Like all methods that lead to closer cooperation between patient and therapeutists the work has had a distinctly good psychological effect. In written reports I have had the patients give me, I find such statements as the following: helps to relax, quiets the heart, lessens fatigue, increases endurance. I have a very strong impression that the more intelligent the patient the more benefit is he likely to receive from carrying out your adjuvant along with other necessary measures."

Conclusion

I do not believe that there is anything more I can say about how the anesthetist can be of real help to the operating surgeon and to the patient. How to anesthetize and what local and general anesthesia you should resort to, you know better than I, and all the details of the anesthesia will be agreed upon between yourselves and the operating surgeons. Since the day when, 79 years ago, before a group of surgeons assembled in the amphitheatre of the Massachusetts General Hospital, Morton demonstrated the greatest contribution of American science to the civilized world up to this date, you his disciples have made anesthesia a great specialty and by so doing have rendered to surgical science, and through it to humanity at large, most valuable services. May you continue in your labors and by your researches add still greater safety to local and general anesthesia and thus bestow more lustre upon this new but so important branch of medical science.

16 W. 95th. St.

Scopolamin-Morphin Narcosis, The Influence of, on Renal Function. Barnes. *Urologic & Cutaneous Review*, August, 1925.

Barnes states that the method of administration is the greatest factor in determining the efficiency of the drug. In deciding upon the dosage to be used, and the number of times it is to be repeated, there are several matters to be taken into consideration. If the patient is a healthy adult male, the following dosage is used: 1/150 gr. scopolamin hydrobromid and 1/6 gr. of morphin sulphate is given by hypodermic injection thirty minutes before the examination is begun. This is repeated immediately previous to putting the patient on the table, and will usually be sufficient if the examination is short. If, after beginning, it appears that the cystoscopy will take longer than at first thought, the same dosage of the two drugs should be repeated thirty minutes after the last dose. A local anesthetic of ten per cent novocain or one per cent stovain in the male and ten per cent cocain in the female urethra, is used in conjunction with this. If the patient is apparently not healthy or robust, or is small, 1/200 gr. of scopolamin with 1/8 gr. of morphin is given thirty minutes before the examination, and repeated immediately before. If this is found to be insufficient, or if it is found that the examination will be longer than at first thought, the same dose may be repeated. It is usually better to give the smaller doses, and repeat them until the proper degree of narcosis is obtained, than to give too large a dose at first.

If administered correctly, the analgesia produced is sufficient to allow intravesical manipulation in the most difficult cases. In fact, patients have slept while ureteral catheterization was being done. Even in cases of severe tuberculous cystitis, which are undoubtedly the most difficult for ureteral catheterization, and the most painful to the patient, there is very little pain.

Probably the most serious objection to the use of scopolamin-morphin narcosis, or to the use of any opiate in fact, is that it retards renal function, thereby rendering the phenolsulphonephthalein test inaccurate and unreliable.

Barnes conducted a series of observations on 25 cases and tabulated his results, which seem to show that in the majority of cases scopolamin-morphin narcosis does not influence the output of phenolsulphonephthalein to such an extent as to contraindicate it as an agent for cystoscopy.

Respiration, Action of Epinephrin on. L. R. Nice and A. J. Neil, Norman, Okla. *American Journal of Physiology*, August, 1925.

Nice and Neill state that within limits small doses of epinephrin injected into the blood stream of anesthetized cats, dogs and rabbits may cause an increase in the depth of respiration, while large doses produce a reversal effect or shallowness. There is a range in which the effects of epinephrin or respiration are independent of its influence on blood pressure. Large doses, however, invariably produce apnea and a rise in blood pressure. These results do not support the anemic theory.

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F. Hoeffer McMechan, A.M., M.D., *Editor*
Avon Lake, Ohio, U.S.A.

April Editorials 1926

1926—CONGRESS OF ANESTHETISTS—1926

Joint Meeting with the British Medical Association, Section on Anesthetics, Nottingham, England, July 20-23.

Clinic Tour Abroad, June 18 to August 20.

Through the courtesy of its Council, members of the Associated Anesthetists of the United States & Canada and the International Anesthesia Research Society are being invited to attend the Congress of Anesthetists to be held in connection with the meeting of the British Medical Association, Section on Anesthetics, in Nottingham, England, July 20-23, 1926.

This is a wonderful recognition of the specialty of anesthesia and an evidence of its international prestige and development.

To realize the possibilities of this Congress to the full a Clinic Tour Abroad has been arranged to provide not only a very enjoyable itinerary of sightseeing but also professional and scientific contacts that should prove most desirable and instructive.

To reciprocate the courtesy that is being extended the specialty it is hoped that a very large group of anesthetists will attend the Congress and join the Clinic Tour. This is your one, big opportunity for going abroad yourself, taking the family, who have always wanted to go, and getting congenial friends to join the party.

The following Office Bearers have been selected by the Council of the British Medical Association to develop the program for the Congress:—Samuel Johston, M.D., M.A., F.A.C.P., *President,* Toronto, Canada; R. E. Apperley, M.R.C.S., L.R.C.P., *Vice-President,* London; A. L. Fleming, M.B., *Vice-President,* Bristol; F. H. McMechan, M.A., M.D., *Vice-President,* Avon Lake, Ohio; A. M. Webber, M.S., F.R.C.S., *Hon. General Secretary,* Nottingham; Ian R. Spark, M. B., *Hon. Secretary,* Nottingham and C. Langton Hewer, M.B., *Hon. Secretary,* London.

The preliminary program has scheduled the following general topics for the several sessions:—*First Session,* Presidential Address, The Future of Anesthesia. *Second Session,* The Newer Gas Anesthetics. *Third Session,* Combined Meeting with the Surgical Section, The Surgical and Anesthesia Problems of Gastric Surgery and Splanchnic Anesthesia. *Fourth Session,* Combined Regional and General Anesthesia. *Fifth Session,* Demonstration of Apparatus.

Leading anesthetists and surgeons of international reputation and achievements will take part and the program of the Nottingham Congress alone will make it worth your while to attend. But aside from this the Scottish Society of Anesthetists is arranging a meeting while the Tour is in Scotland with a program that will be devoted to the practical side of clinical anesthesia. The Anesthetic Section of the Royal Society of Medicine is taking full charge of the week in London and a program of clinics, demonstrations and several sessions of papers is in the making. It will also be the good fortune of those on the Clinic Tour to visit some of the Scandinavian capitals and to attend the International Congress of Physiologists in Stockholm, August 3-5.

The cost of the Clinic Tour, all inclusive from Quebec June 18 to New York August 20, will be $1195.00. This is much more reasonable than any similar trip you could arrange for yourself and as there will be no Congress at home in 1926, you can use the amount usually spent in attending it in going abroad.

On account of the heavy demand for accommodations it is imperative for you to make your reservations at once in order to secure the location you desire. All concerned will make every effort to have the Congress and Clinic Tour meet your expectations.

The following detailed itinerary has been arranged for the Clinic Tour Abroad:—

June 18, *Friday,* sail from Quebec on the Canadian Pacific Steamship *Montroyal,* ($150.00 berth included in Tour price).

June 25, *Friday,* due at Liverpool, one of the world's greatest seaports. Disembark and remain overnight at the Midland Adelphi Hotel.

June 25, *Saturday,* leave Liverpool by train at 10:50 a. m.: passing through Wales with unique panoramic views of the Welsh Highlands. Lunch

on train. Arrive at Holyhead 1:47 p. m. and transfer to steamer across Irish Channel. Arriving at Kingstown, Ireland, at 5:25 p. m. By rail to Dublin, due 6:00 p. m. Shelbourne Hotel.

June 27-28, Sunday and Monday, in Dublin, Capital of Ireland. The first morning will be free for individual action. In the afternoon there will be a drive in the city with its wide streets and many bridges across the River Liffey which divides the city into two parts. Monday will be devoted to further sightseeing and professional contacts.

June 29, Tuesday, leave Dublin at 9:45 a. m. through picturesque Southern Ireland to Killarney, arriving at 2:45 p. m. Transfer to the Alexandra Hotel.

June 30, Wednesday, in Killarney. Drive through the many weird mountain defiles and along the shores of the beautiful Irish Lakes.

July 1, Thursday, leave Killarney at 8:37 a. m. by rail to Cork, arriving at 10:55 a. m. Transfer to the Hotel Imperial. In the afternoon there will be a drive to Blarney Castle chiefly noted for its celebrated Blarney Stone.

July 2, Friday, leave Cork at 8:00 a. m. Arriving at Dublin at 1:05 p. m. Luncheon in Dublin. At 3:00 p. m. leave by train arriving in Belfast at 5:30 p. m.

July 3-4, Saturday and Sunday, in Belfast, occupying a fine position on the River Laggan. On one of the afternoons there will be a motor trip in the city with a visit to the Giants' Causeway.

July 5, Monday, departure from Belfast 9:05 a. m. by rail to Larne. Transfer to Cross Channel steamer 9:55 a. m. Arriving Stranraer, Scotland, 12:03 p. m. Transfer to train leaving 12:25. Arriving in Glasgow 3:00 p. m. Transfer to the Central Station Hotel.

July 6, Tuesday, in Glasgow. Opportunity to visit the busy industrial section and the many shipbuilding works along the River Clyde.

July 7, Wednesday, all day trip through the picturesque Lake District of Scotland. By rail from Glasgow to Balloch and on Loch Lomond to Inversnaid. By coach (tally-ho) over the mountains to Stronachlacher and by steamer on Loch Katrine past the charming little Ellen's Isle, immortalized in Scott's "Lady of the Lake," to the Trossachs; thence by motor coach to Callander and by rail to Edinburgh. North British Station Hotel.

July 8-9, Thursday and Friday, in Edinburgh. Professional contacts with the Scottish Anesthetists. Thursday morning will be devoted to a motor coach trip in the city, visiting the countless historical attractions and the afternoon will be devoted to a motor coach trip to the Firth of Forth Bridge, traversing the scenic environs of the Scotch capital. Departure from Edinburgh will be at 4:20 Friday afternoon, arriving in Manchester at 10:33 in the evening. Transfer to the Midland Adelphi Hotel.

July 10, Saturday, in Manchester. Departure will be at midnight in sleepers.

July 11-18, Sunday to Sunday, arrive in London early in morning and transfer to the Royal Court Hotel. In London the entire week with attractions to numerous for individual mention. Clinics, demonstrations and sessions of papers with the Anesthetic Section of the Royal Society of Medicine and contacts with the foremost London anesthetists. Motor coaches will be used for a comprehensive trip about the city: one full day will be devoted to general sightseeing; one morning to the British Museum and Sunday to a combined motor, coach and motor boat trip on the Thames to Windsor, Hampton Court and Stoke Poges.

July 19, Monday, leave London in morning, arriving at Leamington for lunch. Transfer to Hotel Regent. After lunch a motor coach excursion through the Shakespeare country visiting Warwick with its picturesque Castle, the ruins of Kenilworth and Stratford-on-Avon, birthplace of the great poet. The motor coaches will return to Leamington and departure for Nottingham will be late in the evening (2½ hours by rail).

July 20-23, Tuesday to Friday, in Nottingham, attending the Congress of Anesthetists with the meeting of the British Medical Association.

July 24, Saturday, leave Nottingham in early morning via London, Midland & Scottish Railway arriving at St. Pancras Station, London, 9:56 a. m. Transfer to Victoria Station for the 11:00 a. m. train for Paris, via Dover-Calais, arriving in Paris 6:15 p. m. Hotel Moderne.

July 25-29, Sunday to Thursday, in Paris. The program will include a comprehensive motor coach drive in the city and an all day excursion to Versailles. Anesthesia clinics are also being arranged for. Depart from Paris at 10:50 p. m. on July 29 in sleepers.

July 30-31, Friday and Saturday, arrive Amsterdam in time for lunch. Visit Ryks Museum and other points of interest in afternoon. Victoria Hotel. July 31, visit the Isle of Marken with stops at Broek, Volendam and Monnikendam. Depart in evening at 6:49 p. m. in sleepers.

August 1, Sunday, arrive in Hamburg in early morning, 6:17 a. m. leaving on scenic daylight trip for Copenhagen at 8:36 a. m. Arrival in Copenhagen at 7:35 p. m. Hotel Tourist.

August 2, Monday, in Copenhagen, sightseeing by motor coach. Leave after dinner in sleepers for Stockholm.

August 3-5, Tuesday to Thursday, in Stockholm, attending the International Congress of Physiologists. One day will be devoted to a survey of Stock-

holm's many attractions. Those in the Tour will participate in the social functions of the Congress. Depart after dinner on August 5 in sleepers.

August 6, *Friday,* en route to Hamburg, arriving there at 9:11 p. m. and transfering to sleepers leaving at 11:03 p. m. for Frankfort.

August 7, *Saturday,* all day visit in Frankfort. Hotel Frankfurterhof.

August 8, *Sunday,* by rail to Mayence and all day steamer trip on the historic Rhine. Arrival in Cologne in evening, Hotel Monopol-Metropole.

August 9, *Monday,* visit the Cologne Cathedral. Leave at 1:48 p. m., arriving in Bremen at 8:15 p. m.

August 10, *Tuesday,* day of rest in Bremen before sailing, Hellman's Hotel.

August 11, *Wednesday,* Embark on the United States Line Steamship *President Harding,* ($150.00 berth).

August 19, *Thursday,* due in New York.

General Information

Price of Tour.—All inclusive from Quebec June 18 to New York, August 20, $1195.00.

Registration.—A deposit of $30.00 is required to secure definite reservation. This amount is returnable in full at any time up to 30 days before sailing date. It will be refunded after that time if the amount deposited for steamship space can be recovered. Application for membership in the Clinic Tour should be made direct to the Travel Department, American Express Co., 65 Broadway, New York, N. Y.

Final Payment.—Final payment is due on May 15.

Steamship Accommodations.—The Tour price includes Transatlantic Steamship passage at rates indicated in the itinerary. The amount shown for Eastbound passage (to Europe) includes the $5.00 tax levied by the U. S. Government on all steamship tickets to Europe.

The steamship rates indicated are the minimum rates on those steamers and provide for comfortable accommodations. Such accommodations are usually sold first and their availability, therefore, depends on how early applications for bookings are received. Other accommodations at slightly higher rates, depending on location, will be furnished if desired and the difference as indicated by the steamship company's rate sheet will be added to the price of the Tour.

Leadership.—An experienced Tour Manager will meet the party upon its departure from Quebec and travel with the Tour in charge of all business details back to New York. He will be assisted wherever necessary by local guides furnished from the permanent staffs of American Express offices.

Railway Travel.—Railway travel will be first class throughout.

Hotels.—The hotels used on this Tour will be as indicated in the itinerary or as nearly similar in character as can be arranged for. They are excellent, unpretentious first class, but not de luxe. Rooms will be assigned on the two-in-a-room basis without connecting baths. Rooms with private bath will be arranged if requested at the time of registration. There will be an additional charge for such accommodations when provided based on the supplement charge by the hotel, this amount being payable to the Tour Manager. Rooms with private bath will generally be available; but not always. They will be assigned in the order of application.

Three meals a day will be provided throughout. In the British Isles this includes an egg or meat course for breakfast. On the Continent breakfast consists of coffee, tea or milk and rolls, usually, but not always with preserves. All gratuities, except fees for special service, are paid for by the Tour Manager.

Sightseeing.—Programs of sightseeing have been carefully planned for each city with a view to securing the best results in the time at our disposal. All expenses incident to the programs, such as admission to galleries and museums, local excursions, automobile and carriage drives, and the services of guides, are included in the price of the Tour. The time allotted to each city is sufficient to permit seeing everything of outstanding importance and to leave some time free for rest, shopping, or other plans.

Baggage.—Baggage should be limited in the traveller's own interest. A steamer trunk will be available for the ocean voyages and will also be available without extra charge in London and Paris. Elsewhere, a portmanteau or suitcase and a handbag will suffice and will be handled free of cost.

Extras.—The Tour price includes all calculable expenses and there are practically no extras. The $10.00 fee for passport and the charges for visas in the countries requiring them are not included in the tour price. The American Express Co. will instruct you regarding your passport application and will assist in obtaining the necessary visas.

Other extras, not included in the Tour price, are such personal expenses as laundry, fees to stewards on ocean liners, steamer chairs and rugs, food, beverages or mineral waters which are not ordinarily served by steamship companies, on railway trains or at hotels without extra charge; conveyances, guides or other facilities not ordered by the Tour Manager.

Possible Changes.—The itinerary is offered in good faith and will be followed as closely as possible. The right is reserved, however, to make such changes as may prove to be necessary or advantageous to the group. Should curtailment of the land portion of the itinerary result, a refund will be

made. If for any reason the return sailing should be delayed, the extra cost, due to delay, must be met by the individual tour members.

Withdrawals and Cancellations.—If for any reason a member should withdraw after tour has started, a refund will be made amounting to the actual saving effected through the member's withdrawal, but no refund will be made for an absence of less than two full days. Any members leaving the party should ask the conductor to give them a written statement of the day and hour of leaving and rejoining the party. The tour manager has no authority to make refunds, which will be adjusted by the New York Office only. Any refund made will be based on the actual saving effected on account of the member's absence from the party. This will include the cost of unused rail tickets only when a rewhich the ticket is routed. No refunds can be made for occasional sightseeing trips not taken. The right is reserved to insist at any time upon the withdrawal of any individual detrimental to the spirit and harmony of the group. In case of such action, a complete refund will be made covering the unfinished portion of the tour and every effort will be made to pay such refund without undue delay through the office of the American Express Company located nearest to the point where the member has been asked to withdraw from the tour.

Travel Funds.—American Express Travelers Cheques are recommended as Travel Funds. A simple system of signing and countersigning protects the holder in case of loss or theft and they are universally accepted in lieu of local currency throughout Europe.

Responsibility.—The American Express Company acts only as agent and accepts no responsibility in connection with the service of any steamer, train, automobile, airplane, carriage or other conveyance which is used either wholly or in part in the execution of this tour, and it assumes no responsibility for delay, accident or loss to personal property or for additional expense due to war, storm, epidemic, delay or other cause beyond its control. It assumes no responsibility for baggage, but the management will direct the shipment at "owner's risk" of baggage from place to place, and in the unlikely event of damage, delay, or loss, it will do all reasonably within its power to lessen the hardship incurred. Those who wish to insure their baggage may do so through any of our offices.

Abstracts

The Electrocardiogram and Blood Pressure During Operation and Convalescence. Marvin and Pastor, Boston. *Archives of Internal Medicine*, June, 1925.

Marvin and Pastor state that the blood-pressure was determined and electrocardiograms taken at frequent intervals during anesthesia and operation in thirty patients. Blood-pressures were determined and clinical notes made at regular intervals each day for ten or more days of convalescence.

The blood-pressure during operation varied considerably; it was constantly above and constantly below the preoperative level in an equal number of cases. Changes in pressure in either direction seemed to be without clinical significance except when there was extreme lowering of the systolic and pulse pressures in cases of shock.

The majority of patients in their series failed to show the postoperative fall in systolic and pulse pressures reported by some observers and assumed by many. Of the few patients who did show such a fall, none developed postoperative complications or had a protracted convalescence.

Blood-pressures during the first thirty hours after operation, as well as those taken during the following ten days, were found to be of no value in estimating the likelihood of complications or the rapidity of convalescence.

Electrocardiograms taken during operation showed definite changes, not present in preliminary tracings, in about half the cases. The chief of these were premature beats, paroxysmal tachycardia, and disturbances of the pacemaker. They were not associated with demonstrable changes in the circulation, and seemed to be without clinical significance.

In the same periodical in the same issue, Marvin, Pastor and Carmichael state that in this series the blood-pressure was determined, and electrocardiograms taken, at frequent intervals during anesthesia and operation in thirty patients who had been completely digitalized. Blood-pressures were determined and notes of the clinical condition made at regular intervals every day for from eight to eighteen days after operation.

The blood-pressure during operation varied considerably in individual cases. A large proportion (45 per cent.) maintained the pressure above the preoperative level, and about one-fourth showed wide fluctuations above and below the preoperative pressure.

A considerable number of the patients showed a fall in the systolic blood-pressure during the thirty hours following operation. An even larger number showed a decrease in the pulse pressure. These changes seemed to have no relation to the clinical course or the development of complications.

The blood-pressure after the second postoperative day was below the preoperative level in more than two-thirds of the patients. Its behavior, during this period, was found to be of no value in estimating the rapidity of convalescence.

Electrocardiograms taken during the operation showed changes not present in preliminary records in about 37 per cent of the patients. The most frequent of these changes were displacement of the pacemaker, reversal of an inverted T-wave in Lead II, and paroxysmal tachycardia. They were unaccompanied by clinical evidences of circulatory disturbance.

A comparison of the observations on digitalized and non-digitalized patients discloses only few differences. There was a postoperative fall in systolic and blood-pressure in a greater proportion of the digitalized patients than of the non-digitalized. No evidence was secured of a beneficial effect of digitalis on postoperative complications or deaths.

Exophthalmic Goiter, Special Operative Risks of. T. P. Dunhill. *Lancet*, 1925.

T. P. Dunhill discusses this subject and asks, At what stage of the disease, then, should operation be performed? The chief consideration will be the fact that the patient is not improving—or is actually losing ground—at the end of a period of treatment, the length of which must vary according to the social position or the family responsibilities of the individual. No actual time limit can be laid down, though it is certain that operation is very rarely called for within the first six months of the disease. There is, however, a limit to the time during which a heart can endure the constant toxi-

city without failing in some respect, and when the failure begins it is usually progressive; also exophthalmos may become so extreme that its ultimate disappearance is unlikely, or it may lead to corneal ulceration; or, again, the restlessness associated with the disease may appear to be progressing towards mental instability. If conditions such as these are present when a patient first comes under the care of a practitioner, it is a matter for consideration whether there should be any delay in operating except such as is necessary for thorough investigation. Mental instability may even indicate that the time for operation has passed. If the surgeon can co-operate with a physician interested in these cases, some degree of heart failure should not be a bar to surgical intervention, for there is the certainty of great amelioration in the condition of the patient. The occurrence of corneal ulceration, due to extreme proptosis, should determine early surgical intervention, surgeon and ophthalmologist working intimately together.

The social position and family responsibilities of a patient will greatly influence a practitioner. When complications such as those indicated above threaten or are present, surgical treatment becomes imperative whatever the social position of the patient, but if the individual can afford to, and will, rest completely, there is less risk of visceral degeneration than in one who must work for a living or support a family. The time for operating on the patients can be chosen when they become weary of ill-health, or when the practitioner realizes that enough time has been given to non-surgical treatment. With the poor patient the case is different Even here operation should not be unduly hurried, but women earning their own living and working-class mothers or fathers of families can rarely rest at home, and there are not enough hospital beds available to give all of these patients continuous rest and nursing for a sufficiently long period. It is to be remembered that it is usually a matter of years and not of months. Furthermore, it is a fact that, because of this lack of facilities for rest, these patients lose ground more quickly, drift around from one out-patient department to another, with occasional periods of rest in hospital, and are not only unable to support themselves or their families, but become permanently ill. The economic factor, therefore, determines surgical treatment earlier in the less well-to-do classes of the community. A review of these factors will in most cases, leave no doubt in a practitioner's mind when, in the patient's interest, the time has come to consider surgical intervention.

Special Operative Risks.—Such patients present some special operative risks not present in the average surgical case. The symptoms of the disease become incompatible with life if they are allowed to increase beyond a certain degree. Operation undoubtedly augments all of these, at least, temporarily. The knowledge that operation is impending, and the preparation for it, stimulate the activity of the gland, apart from the actual handling of it during operation. This cause was recently responsible for the sudden death of a young patient in the throat department of a hospital while she was waiting for her tonsils to be removed. Extreme mental unrest is a dangerous symptom. Glycosuria is not infrequently present and its type must be determined. If it can be, and is, controlled, it is not a contraindication to operation, but if it cannot be checked operation should only be performed after careful weighing of the factors. No operation should be performed while the slightest catarrhal condition of the respiratory system is present, because the handling of the region of the laryngeal nerves and the trachea stimulates secretion and interferes with its efficient expulsion, and if catarrh has been present before operation much inconvenience and some danger result. A high basal metabolic rate, and a pulse-rate persisting at or above 130 per minute while a patient is in bed would indicate that operation should be postponed. These conditions can often be controlled temporarily, but not sufficiently, to render operation safe. Walton has drawn attention to a fact recognized by all concerned—viz., that patients are decidedly more unhappy in warm weather. This is due to the fact that the skin is always hot and moist, and so heat cannot be eliminated rapidly enough for comfort or safety. Therefore no operation should be performed during a hot spell. C. Mayo has pointed out that it is not an emergency operation, and patients should always await the most suitable time. Lastly, loss of cardiac compensation brings its own dangers, and patients in this condition should only be handled surgically in co-operation with a physician who is accustomed to deal with this type of case, and whose judgment can be relied upon to determine what can and what cannot be done.

Scopolamin-Apomorphin Amnesia in Criminology. E. House, Ferris, Texas. *Current Researches in Anesthesia and Analgesia*, June, 1925.

House states that a process by which memory can be extracted, against the will, from an individual's subconscious mind is by injecting under the skin a sufficient amount of those drugs which tend to destroy temporarily all the functions of the brain except the activity of the center of hearing.

The technic which he now uses is as follows: To attempt to obviate excitement if possible, he gives first scopolamin gr. 1/100; in ten minutes more he administers scopolamin gr 1/100; in another ten minutes he injects scopolamin gr. 1/200 plus apomorphin gr. 1/40. Emesis rarely follows apomorphin gr. 1/40, but will with few exceptions follow gr. 1/30. This method is often too large a dosage for a person under eighteen years of age as it will likely produce convulsions, which, however, can be controlled with chloroform.

Twenty minutes later he runs the memory test by showing the individual some article every three minutes until four articles are shown. Then in five minutes he requests the names of the articles in the order shown. If they remember three of the four, unless their articulation is interfered with, he gives another injection of scopolamin gr. 1/200, or anesthetizes again with chloroform.

The next stage of the technic is to save all the scopolamin possible, and also to avoid giving large doses of scopolamin. To do this he contracts the synapses with chloroform.

For absolute perfection he carries the administration to complete surgical anesthesia, thereby destroying temporarily all the functions of the five senses as well as every other function of the upper brain, but not the centers of circulation and respiration.

When the discovery was made that the center of hearing could function normally while the other four centers were artificially asleep, this condition was named, by the advice of interested friends, the receptive stage or the examination stage. By observation he noted that the center of hearing would function from ten to thirty minutes before the next center could normally function, and by the administration of scopolamin gr 1/200 every twenty to thirty minutes the receptive stage could be maintained for an indefinite period. The longest he has maintained this condition of the mind was when he held four murder suspects for four hours. He has held morphin addicts under the influence of hyoscin for two weeks, and, therefore, he would not hestitate to hold a criminal suspect in the examination stage as long as necessary.

In the examination stage the individual does not talk at random, but will reply to a direct question, and one will observe a condition of profound sleep or wakefulness without the ability to reason. This condition is called artificial unconsciousness. Individuals will answer all questions as the answer is stored in their mind, as pure memory. One can also note that the replies are given with childlike simplicity and with childlike honesty without evasiveness, guile, deceit, or fraud.

Notwithstanding what might be said to the contrary, House wishes to emphatically state that with clinical

doses there is no harm in the use of scopolamin. Mental aberrations are only an evidence of small doses. The drug is a heart stimulant, and there are no dangerous after-effects.

In this work one obtains wrong answers if sufficient amounts of the drugs are given; or if the center of hearing is too deeply anesthetized to function normally; or when by asking too many questions the brain becomes tired. Any physician can readily understand the strain such work must entail upon the depressed brain. Questions asked in too loud a voice are liable to bring on convulsions, and it is not uncommon to note muscular tremors run the entire length of the body after a question. So powerful is the center of hearing that overstimulation can produce instant death, and that is why aviators must protect their ear-drums. All questions must be short and plain; long questions must be subdivided. Quite often it follows that he asks a question and notes wrong answers by the twitching of the face and the slowness of the replies, yet by changing the wording of a question, immediately receives a convincing reply.

Every time one asks a question he will receive some kind of a reply, for all of the answers are automatic, and the answer will be in accordance with understanding. Forgetfulness is a characteristic effect of the drug, and with long questions they will forget the first part of the question and will only answer the last part of it. Wrong answers only mean that the impulse was directed to wrong channels because the receptive stage had not fully arrived or the question was not presented in a form to be easily understood.

Experience will teach any one how to note wrong answers. It will also teach one to build up evidence by piecing together short replies. Any reply that does not come quickly should not be accepted. The brain may be compared to a telephone system, the receivers the ear-drums, the wires the nerves, the switch-board the brain, and the operator the soul or life. Scopolamin intoxicates the operator, and if such an operator plugs a wrong number, it would not mean the telephone exchange was not built right. Hence wrong answers only mean the suspect has not reached the examination stage, or has passed unsuspected through the receptive stage.

Sciatica Treated by Epidural Injection. MARBURY. *Virginia Medicql Monthly*, September, 1925.

Marbury notes that injection of the epidural space in the treatment of sciatica is not a new conception. A number of authors have reported good results, and the only wonder is that it has never been more popular, seeing that most forms of treatment, both medical and surgical, have not been brilliant in their results. Stretching the nerve was practiced at one time, but has been abandoned. Manipulation under an anesthetic has proven of benefit in certain cases, but on the whole has not been particularly beneficial. The removal of foci of infection. such as those about the teeth, or tonsils, or in the gall-bladder, is important and should be attended to in each case. The treatment by immobilization in a plaster cast has been beneficial, particularly in cases in which there is a definite history of injury. These are just a few of the many treatments that have been used to alleviate the pain commonly known as sciatica.

Cathelin and Sicard injected the epidural space as early as 1901 for relief of pain in sciatica. They used cocain in saline solution. Ott reports forty-eight cases treated by the injection of 50 cc of 0.5 per cent novocain in physiological saline. At the same time all possible foci of infection were removed. In this series 29 per cent were permanently cured, 37 per cent were restored to active life with a fair degree of comfort, and 34 per cent were apparently not improved. Other authors have reported even greater success. Feuillade had 80 per cent of cures among soldiers.

The technic is fairly simple. No previous preparation of the patient is necessary. The injection may be done at a hospital, at the patient's home, or in the office, where the case is ambulatory. The patient lies face downward over several pillows placed so as to elevate the buttocks. The hiatus sacralis is located at the junction of the sacrum and coccyx. In a thin subject this is not difficult, but in very stout subjects it is helpful to put a gloved finger in the rectum and, by manipulating the coccyx, locate the hiatus. Under strict aseptic conditions a Labat spinal needle is inserted through the skin at an angle of about 45 degrees, and a small amount of novocain injected. This is continued until the needle can be felt to impinge upon the bone. A little novocain is injected ahead of the needle at each advance, which makes the procedure practically painless. When the needle is felt to touch the sacrum it is depressed about 10 degrees and usually slips into the sacral canal without difficulty. It should be inserted 5 or 6 cm., being careful not to puncture the dura. If any spinal fluid appears after waiting a few seconds, the needle is withdrawn one or two centimeters, and the injection is not begun until it is quite certain that the needle is not in the subarachnoid space. The solution is prepared by sterilizing novocain in a small amount of physiological saline and then adding enough of the latter to make 50 cc of a 0.5 per cent The solution is injected slowly. The patient usually complains of pain on the affected side; this is a favorable sign.

If one injection does not relieve the pain it is well to repeat it in two days. Several injections may be given.

Of the ten cases that form the basis of this report, seven were male and three female. All but two had definite pain along the course of the sciatic nerve. One of these had pain in both legs which was generalized; the other on the outer side of the thigh. Seven were confined to bed when first seen and three were ambulatory. Only one gave a definite history of an injury, and in another case the attack followed a long automobile ride and a bad cold. Lasegue's sign was positive in six cases. An *x*-ray was taken in four cases, and in each case the roentgenological report was osteoarthritis of the lumbar spine or sacral region, or both. The number of injections varied from 1 to 4—average 1.6. Focal infection may have played a part in five cases. The average duration of symptoms before injection was 7.3 weeks. Four cases were apparently cured, three improved. and three not improved. One of the latter probably should not be counted because it is doubtful if any fluid reached the epidural space.

The author records a number of cases in detail—one of them a bedridden woman suffering from sciatica for more than a year. Four injections each of one-half per cent novocain in the epidural space at intervals of two to three days accomplished a cure. She had previously had alcohol and novocain injections without benefit.

A man, fifty-five years of age, complaining of pain so severe as to require the use of morphin. The first injection in the vicinity of the sciatic nerve brought no relief. Forty cc injected into the epidural space was followed by cure.

Tonsillectomy in Rural Practice. HULBERT. *Medical Journal and Record*, September 2, 1925.

Hulbert believes that the technic of tonsillectomy can be so simplified as to permit its being carried out in the home or office of the rural physician, with as satisfactory results as are obtained in the hospital—thus bringing this service within the reach of many who need it.

This paper represents a review of 100 consecutive tonsil operations taken from rural practice, covering a period of two years. Sixty-six children were operated under ether anesthesia; the adults, thirty-four, under local anesthesia. An arbitrary age of fifteen years was taken as the dividing line between children and adults. There was no fatality. In one child pleurisy developed in the third week following general anesthesia, lasting

one week and terminating in complete recovery. There were no other complications. In 60 per cent of cases the patients gave as their chief complaint frequent attacks of tonsillitis, sore throat, and quinsy, varying in duration from a few days to eight weeks. In the children restlessness at night, and a "general run-down condi- this symptom was associated with mouth breathing, tion." In this group, especially among the children, frequent winter and spring colds were common, complicated by middle-ear infection. This tendency was more marked in those patients having an abundance of adenoid tissue. Eight and two-tenths per cent of the patients gave colds as their chief complaint; 3.5 per cent of the adults complained of rheumatism, and one patient complained of "localized neuritis." Nine per cent complained of tiredness and a lack of usual vigor. Chorea existed in one child.

As to local anesthesia, 1.5 per cent novocain solution was used, with the addition of adrenalin.

The anesthetic was infiltrated posterolateral to the tonsil, using a fine hypodermic needle on a 5-cc all-glass syringe fitted with a three-and-a-half-inch extension to permit of deep infiltration. The infiltration was started at the superior pole of the tonsil well back from the margin of the anterior pillar in an effort to get behind the tonsil and place the anesthetic in the region of the tonsillar plexus of nerves, anesthetizing the superior pole of the tonsil, the soft palate, and palatine arches. The needle was next introduced through the anterior pillar at its midpoint, and carried behind the tonsil infiltrating the capsule and lateral surface of the tonsil. The third point of infiltration was deep beneath the lower pole of the tonsil and on a line with angle of the jaw. An effort was made to infiltrate behind the field of operation rather than in it. Postoperative pain was thus minimized.

A 26-gauge 3.5-cm. needle was used, which allowed of painless introduction and deep infiltration. The injections were made very slowly, using little force. First the right and then the left tonsil was infiltrated, allowing ten to twenty minutes for the effect to be produced. Toxic symptoms were rarely noticed.

The operation can be done quickly, causes little discomfort to the patient, and is entirely painless. The minimum amount of trauma and no resulting shock combine to make a quick and comfortable convalescence.

The patients were allowed to react in the office and then return to their homes two or three hours after the operation. In the cases in which local anesthesia was used, the patients returned home immediately, with instructions to remain quiet. All patients were permitted cold food on the day of operation, and a regular diet thereafter. A cleansing gargle was used every two or three hours consisting of salt and soda of each one-half teaspoonful to half a glass of warm water. Healing was complete in from one to two weeks. The throats remained sore for about one week, but there was little or no discomfort after the first twenty-four or thirty-six hours. Convalescence was more rapid in the children than in adults. Difficulty in swallowing was relieved by allowing the following powder to dissolve on the tongue: Acetylsalicylic acid, two and a half grains; acetanilid, half a grain.

In only three of the cases in this series was there any degree of postoperative hemorrhage. All were of mild type, and occured in the cases in which operation was performed under a local anesthetic. Two were due to dislodgment of large clots by coughing; the other because of a mild inflammatory condition of the surrounding tissues. Both were arrested by direct pressure.

Forty-eight per cent of the patients have been cured of all symptoms complained of at the time of operation; forty-nine per cent were very much improved, and three per cent unimproved. The greatest percentage of cure was in the child groups; sixty per cent as compared with thirty-four per cent in the adult group. This is explained by bearing in mind the fact that the chief complaints among the children were the immediate result of their diseased tonsils and adenoids, while in the adult group the complaints were remote results or complicating conditions following long-standing tonsillar infection, many of which were permanent or had become chronic.

Tonsillitis and sore throat were decreased eighty per cent in the tonsillectomized children. The tendency to frequent winter colds was greatly reduced, especially in those having had enlarged adenoids. In this same group there was a decrease in ear infection. The incidence of measles was not affected. The tendency to diptheria infection was reduced.

Postoperative Pulmonary Complications, The Prevention and Treatment of. LINDSAY. *Proceedings of the Royal Society of Medicine*, July, 1925.

Lindsay states that there is a growing belief that the postoperative lung complications such as pneumonia, pleurisy, and collapse, which have been an endless source of contention and mutual reproach between surgeon and anesthetist, are not the simple matter of either irritation or congestion, and infection, as has been alleged. Wharton and Pierson, in the *Journal of the American Medical Association*, 1919, stated it as their considered opinion, after the investigation of 1600 gynecological operations, that 40 per cent of the cases of pleurisy, and 12 per cent of those of pneumonia, after operation, were in reality cases of pulmonary embolism and infarction.

It would be as well, at this stage, to point out that the size of the embolus is the important factor, and, dependent on this, we may distinguish:

(*a*) The classic type of massive embolism, occluding one or other pulmonary artery, or bestriding the bifurcation and obstructing both; more usually the right is affected, as Rupp has shown.

(*b*) The infarction type, with severe onset followed by pleurisy and by signs of consolidation.

(*c*) The type in which the site of the embolus prevents recognition as it is an infarction on the inner surfaces of the lobes. This type is associated with slight increase of the rate of respiration, a slight evening rise of temperature, and the expectoration of small collections of blood and mucus.

There is but little mention in English surgical literature of this last type, but DeQuervain, Wharton and Pierson, and Lee, all recognize its significance in giving warning of the onset of the more severe types.

Post-mortem examination has revealed in 42 per cent of cases thrombosis in the veins of the pelvis and lower extremities. 50 per cent of which were in the left iliac or left common iliac vein. Wharton and Pierson agree with this when they state that 41 per cent of cases are associated with femoral phlebitis. In gynecological cases, thrombosis of the pelvic, iliac and femoral veins was found in 47 per cent, and in the stomach cases thrombosis of similar veins was discovered in 57 per cent of cases. It can definitely be said that this is lower than would have been the case if full post-mortem examinations of the whole body had been allowed, and not of the abdomen only, as is so often the case after death following abdominal operations. He mentions these two types of operation especially, as one is portal and the other is systemic. In none of the notes of the post-mortem examinations was there any mention of extensive thrombosis in the area of operation. In many of the cases crossed thrombosis occurred. As has been noted above, the left common iliac vein accounts for 50 per cent of the cases in which a thrombus was discovered. Presuming that stasis is one of the most important factors, with the sigmoid flexure and the rectum emptying irregularly, or with the aid of enemata, it is possible that there is a greater stasis on the left side. The less direct drainage of the left common iliac vein may be a further factor. The time when embolism took place after operation in this series averaged out at the tenth day for stomach and appendix cases.